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The *Elachista dispunctella* (Duponchel) complex (Lepidoptera, Elachistidae) revisited, with exceptional level of synonymy

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Abstract

The *E. dispunctella* and *E. triseriatella* complexes *sensu* Traugott-Olsen are merged. The newly delineated *E. dispunctella* complex is re-defined and diagnosed. Until now, a total of 64 species has been assigned to this species complex. The taxonomy of the constituent species has been obscure owing to their identities based on unvalidated traits, in particular subtle differences on branching points of forewing veins. The taxonomy of the *E. dispunctella* complex is revised on the basis of new material, new and reevaluated information obtained from morphology and biology, as well as from the standard barcode region of COI, with at least partial barcode data derived from 194 recently collected specimens and 33 holotypes. As a result, the number of species considered valid is markedly reduced, with only 19 species now recognized. The following 43 new synonymies are established: *Elachista dispunctella* (Duponchel, 1843) = *E. cahorsensis* Traugott-Olsen,

1992, **syn. nov.**, *E. imbi* Traugott-Olsen, 1992, **syn. nov.**, *E. karsholti* Traugott-Olsen, 1992, **syn. nov.**, *E. mannella* Traugott-Olsen, 1992, **syn. nov.**, *E. multipunctella* Traugott-Olsen, 1992, **syn. nov.**, *E. pocopunctella* Traugott-Olsen, 1992, **syn. nov.**, *E. povolnyi* Traugott-Olsen, 1992, **syn. nov.**, *E. punctella* Traugott-Olsen, 1992, **syn. nov.**, *E. hallini* Traugott-Olsen, 1992, **syn. nov.**, *E. intrigella* Traugott-Olsen, 1992, **syn. nov.**, *E. skulei* Traugott-Olsen, 1992 and *E. niels-pederi* Traugott-Olsen, 1992, **syn. nov.**; *E. tribertiella* Traugott-Olsen, 1985 = *E. toveella* Traugott-Olsen, 1985, **syn. nov.**, *E. baldizonella* Traugott-Olsen, 1985, **syn. nov.**, *E. velelaella* Traugott-Olsen, 1992, **syn. nov.**, *E. bazaella* Traugott-Olsen, 1992, **syn. nov.** and *E. louiseae* Traugott-Olsen, 1992, **syn. nov.**; *E. parvula* Parenti, 1978 = *E. minusculella* Traugott-Olsen, 1992, **syn. nov.** and *E. blancella* Traugott-Olsen, 1992, **syn. nov.**; *E. maboulella* Chrétien, 1915 = *E. catalunella* Traugott-Olsen, 1992, **syn. nov.**, *E. gerdmaritella* Traugott-Olsen, 1992, **syn. nov.** and *E. gielisi* Traugott-Olsen, 1992, **syn. nov.**; *E. glaseri* Traugott-Olsen, 1992 = *E. rikkeae* Traugott-Olsen, 1992, **syn. nov.**, *E. totanaensis* Traugott-Olsen, 1992, **syn. nov.**, *E. olemartini* Traugott-Olsen, 1992, **syn. nov.**, *E. bengtssoni* Traugott-Olsen, 1992, **syn. nov.**, *E. senecai* Traugott-Olsen, 1992, **syn. nov.**, *E. wadielhiraensis* Traugott-Olsen, 1992, **syn. nov.**, *E. rissaniensis* Traugott-Olsen, 1992, **syn. nov.** and *E. michelseni* Traugott-Olsen, 1992, **syn. nov.**; *E. hispanica* Traugott-Olsen, 1992 = *E. vivesi* Traugott-Olsen, 1992, **syn. nov.**, *E. cuencaensis* Traugott-Olsen, 1992, **syn. nov.**, *E. vanderwolfi* Traugott-Olsen, 1992, **syn. nov.**, *E. amparoae* Traugott-Olsen, 1992, **syn. nov.**, *E. varensis* Traugott-Olsen, 1992, **syn. nov.**, *E. luqueti* Traugott-Olsen, 1992, **syn. nov.**, *E. occidentella* Traugott-Olsen, 1992, **syn. nov.** and *E. clintoni* Traugott-Olsen, 1992, **syn. nov.**; *E. berndtiella* Traugott-Olsen, 1985 = *E. casascoensis* Traugott-Olsen, 1992, **syn. nov.**; *E. triseriatella* Stainton, 1854 = *E. contisella* Chrétien, 1922, **syn. nov.**, *E. gregori* Traugott-Olsen, 1988, **syn. nov.**, and *E. lerauti* Traugott-Olsen, 1992, **syn. nov.**; *E. elsarella* Traugott-Olsen, 1988 = *E. svenssoni* Traugott-Olsen, 1988, **syn. nov.**; *E. galactitella* (Eversmann, 1844) = *E. madridensis* Traugott-Olsen, 1992, **syn. nov.** *E. deresyensis* Traugott-Olsen, 1988 is resurrected as a valid species, **stat. rev.** Evidence from DNA barcodes suggests that there may exist further species, but in the absence of distinct morphological differences, they are not formally described as new.

Key words: *Elachista*, *Aphelosetia*, *Elachista dispilella* group, morphology, integrative taxonomy, wing venation, species delimitation, species delineation, DNA barcodes

Introduction

Taxonomically, some species clusters within the Elachistinae (Lepidoptera: Gelechioidea: Elachistidae) are among the most troublesome groups of Lepidoptera. This is due to the paucity of external diagnostic characters and similarity of genitalia, the latter of which are generally considered of high diagnostic value in Lepidoptera taxonomy. These troubles are highlighted in the European *Elachista dispunctella* complex, introduced and defined by Traugott-Olsen (1992). The complex was considered to include 54 species, all occurring in Palearctic region (Kaila 1997). Centres of the species diversity are in Spain and Austria. Elsewhere in Europe the reported diversity is lower, and east of Turkey only one species has been recorded. With no explicit reasoning, this complex was treated separately from the *E. triseriatella* Stainton complex by Traugott-Olsen (1988). These species complexes are merged here due to the absence of any distinguishing features and are collectively called the *E. dispunctella* complex.

Traugott-Olsen (1985, 1992) realized that there are more species than recognized in the *E. dispunctella* group. Due to the external similarity and scarcity of obvious differences in the male genitalia in the constituent species, Traugott-Olsen (1988, 1992) considered the wing venation the most reliable feature for these features were used explicitly as the primary basis to divide taxa into different sections. Subsequently, other characters were searched for to distinguish species within the sections. This led to a situation where identical-looking specimens were placed in different sections and described as different species. Externally, the coloration of the underside of the wings and subtle differences in the male genitalia were used as additional features to differentiate species. The typological species concept followed by Traugott-Olsen did not include intraspecific variation, and led to the recognition and formal description of 27 morpho-species based on a single species.

Albrecht & Kaila (1997), using geometric morphometrics, refuted the taxonomic significance of the kind of variation in wing venation that Traugott-Olsen (1992) used in the establishment of his species sections. The details of wing venation, like inception points of single veins, were shown to be examples of intraspecific variation, often far exceeding that used as diagnostic in defining species sections by Traugott-Olsen (1992). Asymmetry between the right and left wings of the same individual often equalled that between individuals (Albrecht & Kaila 1997). Even though no species of the *Elachista dispunctella* complex was included in that study, one species of the closely related *E. dispilella* complex was included. Following Traugott-Olsen's (1992) guidelines, a population sample of

this species (viz. *E. bruuni* Traugott-Olsen), the least variable species regarding wing venation in that study, would have been divided into four sections of the species complex. Were the logic of Traugott-Olsen (1992) followed, three unjustified additional ‘species’ would have been recognized.

The saccus in the male genitalia, also emphasized in the works of Traugott-Olsen, appears to show more intraspecific variation than any other feature in the male genitalia in *Elachista* (Kaila & Varalda 2004), and it is also vulnerable to distortion during dissection. Dissection experiments of recent samples were conducted to evaluate the effect of preparation technique, in particular, to examine differences created by applying varying levels of pressure using forceps or other tools.

The underside coloration of population samples or specimens grouped by DNA barcodes and genital morphology of *E. mabourella*, *E. dispunctella*, *E. hispanica*, and *E. tribertiella* were examined. No distinguishing features were found to characterize any of them; the only trend observed was that the underside of females tended to be paler than in males.

As a consequence of these findings, the status and identity of Traugott-Olsen’s numerous species is doubtful, and safe linking of virtually no specimens of the *E. dispunctella* complex to a name has been possible since 1992, perhaps the sole exceptions being the Swedish population of *E. elsaella* Traugott-Olsen and the British populations of *E. triseriatella* Stainton. Due to the magnitude of the problem in hand, no comprehensive attempt to revise the *E. dispunctella* complex has been attempted. To start resolving the taxonomic limbo of this species complex, Mutanen *et al.* (2015) performed a study where DNA barcodes of extensive samples of recently collected specimens were examined to see to what extent the samples might cluster. Subsequently, barcodes obtained from 33 holotypes of the *E. dispunctella* complex were associated with these clusters. The findings were almost entirely congruent with the preliminary view of the species delimitation that was based on biology including rearing of larvae, habitats of captured adults, and morphology with extensive genital dissecting. DNA barcoding was also found vital in associating males and females of species. A detailed account of the species delineation methods applied is presented by Mutanen *et al.* (2015) and is not repeated here.

The present paper is a taxonomic revision of the species of the *E. dispunctella* complex, following similar principles in delimiting ‘species’, or rather hypotheses about what constitutes a ‘species’ that contemporary authors have consistently applied to species group revisions of Elachistinae (De Prins & Sruoga 2012, Kaila 1996, 1997, 1999b, 2005, 2007, 2009, 2011a, b, c, 2012, 2015, Kaila *et al.* 2001, 2008, Kaila & Junnilainen 2002, Parenti & Varalda 2003, Kaila & Sippola 2010, Kaila & Mutanen 2012, Kaila & Varalda 2004, Sruoga 2009, Sruoga & De Prins 2009, 2011, Sugisima 2005a, b).

The delineation of species is essentially based on differentiating characters of the genitalia and in external appearance, where emphasis is placed on characters such as length of labial palpi, ciliation on antenna, etc., and, when applicable, wing pattern. The clusters formed by DNA barcodes were considered as an important part of the integrative approach, as they have been shown to be highly informative in other groups of *Elachista* (Kaila 2015, Kaila & Mutanen 2012, Mutanen *et al.* 2013, Kekkonen *et al.* 2015, Kaila *et al.* 2015, but see Kaila & Ståhl 2006). The *E. dispunctella* species complex seems to contain many similar species. Therefore, the morphological characters applied in the present paper as diagnostic may eventually prove misleading. The combination of morphology with DNA based characteristics was the basis in the final step in the decision of the taxonomic ranking. Even if not entirely comprehensive, it is deemed that this approach forms a more robust basis for future refinement of the taxonomy of this complex of species. Similar studies on *Elachista* have been conducted by Kaila & Ståhl (2006) for a study of unclear Australian species complexes, Kaila & Mutanen (2012) for resolving the taxonomy of *E. nuraghella* Amsel *s. auth.*, and Mutanen *et al.* (2013) for an exploration of the diversity of the Palearctic *E. bifasciella* group.

Characterization of the *E. dispunctella* complex

The *E. dispilella* group in a broad sense belongs to those species of the subgenus *Aphelosetia* that have a dorsally directed tongue- or funnel-shaped appendix in the median plate of the juxta (see Kaila (1997, 2007), Kaila & Sugisima (2011), Kaila *et al.* (2015) for further details). The *E. dispunctella* complex can be characterized as consisting of those species of the *E. dispilella* group that do not have a distolaterally pointed apex on the lobes of the uncus (*E. dispilella* complex *s. stricto*, *sensu* Traugott-Olsen 1990) and the vesica of the phallus with cornuti

absent. This is an artificial division aimed to be a practical way to divide the large species diversity of the *E. dispilella* group into manageable units. Some species, like *E. arenbergeri* Traugott-Olsen, 1988, could be included in the *E. dispilella* complex as defined by Traugott-Olsen (1990) on the basis of the shape of the uncus, but due to the absence of a cornutus was placed in the *E. triseriata* complex (Traugott-Olsen 1988), here merged to *E. dispunctella* complex. For consistency, this placement of *E. arenbergeri* is followed here.

The species of the *E. dispunctella* complex are white or pale yellow, with varying extent of scattered dark scales that often concentrate to form an indistinctly delimited plical spot in the middle of wing length at fold and a discal spot at two-thirds of wing length. The scattered scales often serve as a guide to differentiate the members of the *E. dispunctella* complex from other species of the *E. dispilella* group, which almost always have only the two spots as their sole forewing pattern or are unicolorous white or pale yellow (Kaila *et al.* 2015). Several species close to *E. triseriata* have somewhat shiny white forewing ground colour. The general pattern of wing venation is similar to that of nearly all representatives of *Elachista* subgenus *Aphelosetia* (cf. Traugott-Olsen & Nielsen 1977).

Correspondence of DNA-based type association with morphology

The holotypes of *E. moroccoensis*, *E. blancellae*, *E. minusculella*, and a wide sample of specimens, including paratypes of *E. parvula*, appear indistinguishable by morphology. *E. moroccoensis* has a distinctive barcode, and it may represent a cryptic species (Fig. 1). The short fragment of DNA successfully extracted from the holotype of *E. casascoensis* suggests two alternative specimen clusters as its likely placement: either as *E. berndtiella* or as sister to a clade containing *E. dispunctella* and *E. tribertiella* with their allied taxa. Morphology supports the association of the *E. casascoensis* holotype with the specimen cluster that includes the holotype of *E. berndtiella*, with no differentiating characters found to support the status of *E. casascoensis* as distinct from the widespread *E. berndtiella*. The holotype of *E. gerdmaritella*, which was differently placed between the tree-based methods in Mutanen *et al.* (2015), shows no differential features in morphology to specimens of their OTU13. The OTUs with several matching holotypes (e.g., 8, 10, 12, 15) each include specimens that are indistinguishable morphologically. The holotypes are not associated with each of these OTUs, respectively, nor distinguishable from each other in any other way but on the basis of the wing venation traits that were refuted by Albrecht & Kaila (1997). Hence, results from morphology nearly fully correspond to those obtained with barcodes.

Material

This paper is based on the examination of over 400 specimens. Nearly half of these specimens were dissected. Barcoding was at least partially successful for 194 recently collected specimens, and 33 holotypes. These specimens were obtained from the following collections:

BMNH	The Natural History Museum, London, England (K. R. Tuck)
MHNG	Muséum d'histoire naturelle, Genève, Switzerland (B. Landry)
MNCN	National Museum of Natural History, Madrid, Spain (A. Vives Moreno)
MZH	Finnish Museum of Natural History, Zoology Unit, University of Helsinki, Finland (L. Kaila)
NHMW	Naturhistorisches Museum Wien, Austria, (S. Gaal-Haszler)
RMNH	Netherlands Centre for Biodiversity Naturalis, Leiden, The Netherlands (E. J. van Nieuwerkerken)
SMNK	Staatliches Museum für Landeskunde Karlsruhe, Germany (R. Trusch)
SZMN	Siberian Branch of the Russian Academy of Sciences, Novosibirsk, Russia (V. Dubatolov)
TLMF	Tiroler Landesmuseen, Naturwissenschaftliche Sammlungen Innsbruck, Austria (P. Huemer)
ZMKU	Zoological Museum, Kiev National Taras Shevchenko University, Ukraine (A. Bidzilya)
ZMUC	Zoological Museum, Natural History Museum, Copenhagen, Denmark, O. Karsholt)

and private collections of following persons: Bengt Åke Bengtsson, Peter Buchner, Per Falck, Robert Heckford, Jari Junnilainen, Jari Kaitila, Karl-Erik Lundsten, Kari and Timo Nupponen, H. Roweck, Esko Saarela, Jukka Tabell, Zdenko Tokár, Christian Wieser and Bo Wikström.

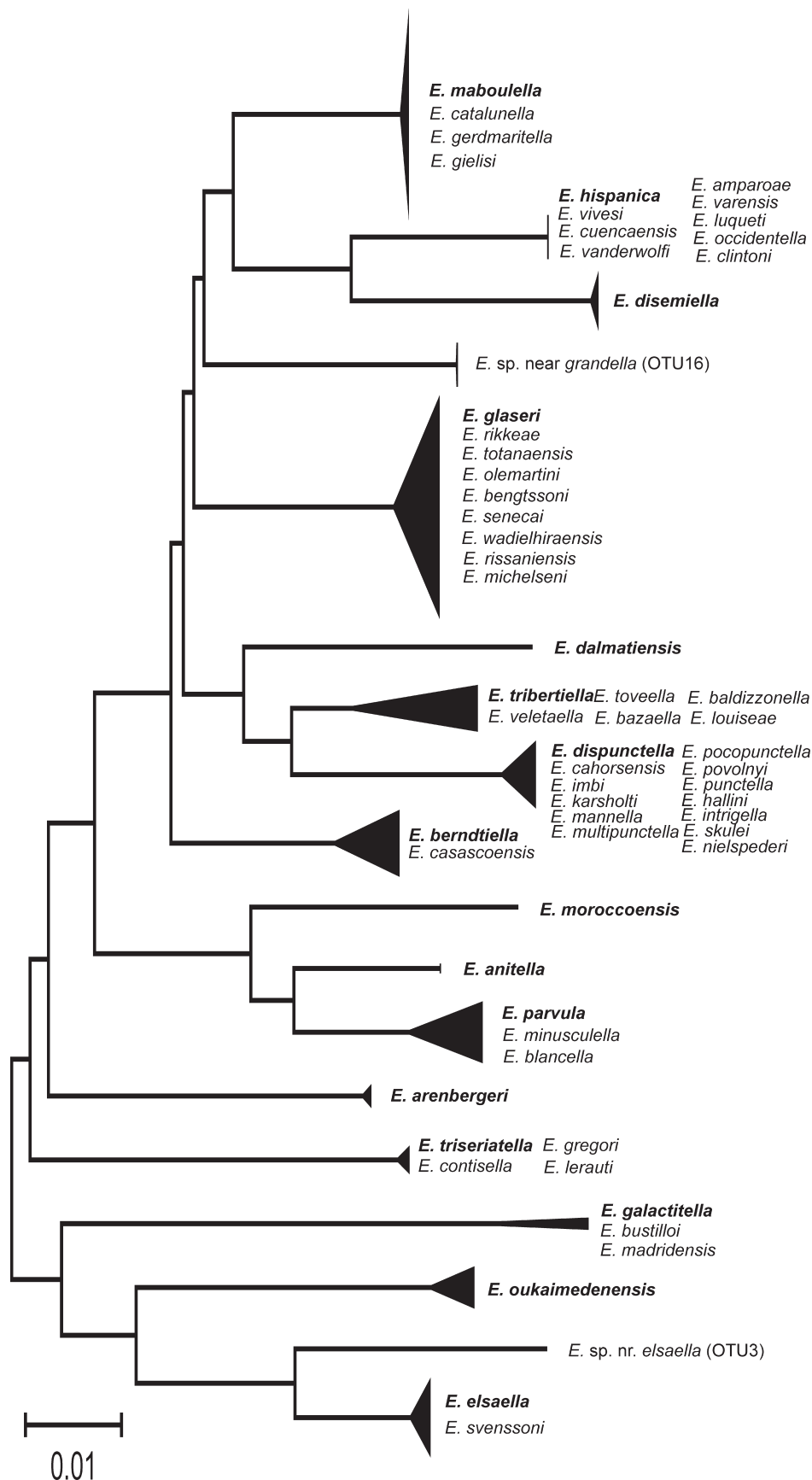


FIGURE 1. A Neighbor-Joining tree, generated under the K2P nucleotide substitution model, of the study taxa. The width of the triangles represents the sample size, and the depth the relative genetic variation within the cluster (2X scale bar). Valid species names are shown in **bold**.

Terminology. The terminology of anatomical structures follows Traugott-Olsen & Nielsen (1977) as refined by Kaila (1999a, 2011a). ‘Digitate process’ refers to a setose lobe situated between juxta and valva. It may be homologous to similar structures observed in other gelechioid groups, with various names applied in different families, (Kaila 2004; Heikkil *et al.*). This term, even though not applied outside Elachistinae, was established and has been constantly used in this group since Traugott-Olsen & Nielsen (1977).

Species delineation. Extensive samples of representatives of the *E. dispunctella* complex were studied, including large samples from single localities, which can safely be considered conspecific due to their external homogeneity as well as similarity of their genitalia, and support from DNA barcodes. In this paper the understanding of intraspecific variation derived from these samples is used as a basis for species delimitation (see also references listed above on the established understanding of species delineation in Elachistinae). The wing venation characteristics consisting of minor differences at inception points of individual veins are here explicitly rejected as a source of taxonomic information (see above). The variation in the colour of the underside of the wings as well as genital characters was estimated on the basis of the supposed conspecific samples.

Due to the overwhelming number of nominal species in the *E. dispunctella* complex, an attempt to get an overview of the complex was undertaken by barcoding an extensive series of recently collected specimens (194 specimens), and those holotypes that were available for barcoding. At least a fragment of the standard barcode sequence of COI was successfully extracted from holotypes of 33 out of 64 nominal species. The holotype sequences were then associated to the clusters of specimens formed of recent samples (Mutanen *et al.* (2015). The specimens clustering together, including holotypes, were subjected to as thorough morphological examination as possible. This task was unfortunately somewhat compromised due to the imperfect quality of some dissections. Especially with holotypes from which no DNA could be extracted and the genitalia had possibly been distorted or destroyed in dissection, a safe conclusion of their identity was not always possible to establish. An example is *E. andorraensis*. In such cases changes to the current classification are not proposed. Barcode clusters were used as helpful guidelines for delineating, not as definitions of species. If DNA barcode and morphology were found to be in agreement with each other, the identification was deemed to be safe.

Two distinct barcode clusters with no name available were observed for samples collected from Slovenia, southern Austria, and northern Italy. In one of these no morphological differences were found between it and another named species. It is left pending further study and the discovery of the presently unknown female. The other putative species seems to possess potentially distinct morphological characters. Due to uncertainty of the range of intraspecific variation of related species, a new name is not here introduced. In one instance, barcode of a named species, *E. moroccoensis*, differed widely from the morphologically identical, widespread *E. parvula*. The single known specimen of *E. moroccoensis* is from Morocco, and *E. parvula* is only known to occur in the northern side of the Mediterranean, from France to Turkey and Crimea. As *E. moroccoensis* had already been named, its status is not altered on uncertain basis. The same cluster also includes *E. anitella*, known from Spain, from where neither *E. parvula* nor *E. moroccoensis* has been found. *E. anitella* barcode falls between that of *E. parvula* and *E. moroccoensis*. Nevertheless, specimens of *E. anitella* possess diagnostic morphological characters, and it is thus recognized as a valid species.

To summarize, DNA barcodes were used as helpful guides in specimen grouping and associating names to the groups, as well as associating males and females, but the species concept upon which the suggested formal nomenclature is built is still based essentially on morphology. Sometimes the differences are admittedly subtle and may eventually prove to be overlapping between species here recognised as valid. In combination with evidence derived from DNA barcodes it is deemed better to preserve existing taxonomy instead of changing it based on weak evidence. No new species are described in this publication.

Taxonomy and distribution

The species of the *E. dispunctella* complex have already been described in detail by Traugott-Olsen (1988, 1992). As the constituent species closely resemble each other, only short diagnoses of the differentiating characters are given, to avoid excessive repetition of previously published information. The associations of males and females have been based, in part, on dubious grounds in earlier literature, and the female descriptions are invariably deficient with only terminal segments and signum shown. Diagnoses are provided for females of those species for

which the male-female association is corroborated by DNA barcodes and/or population samples are available from localities where only one species is known to occur, e.g. *E. elsaella* in Sweden.

Whenever possible, the external appearance and genitalia of all primary types are shown. The holotypes of *E. elsaella* and *E. parvula* were unavailable. For them, images of specimens collected in the type locality are depicted. When the type is in poor condition, an image of a more representative specimen is also included. The genitalia of those females that could safely be associated with males are also shown.

As the taxonomy of the *E. dispunctella* complex has been confused, all published records should be re-examined, which is beyond the scope of the present paper. Therefore in the account of country distribution of each species, generally only records based on specimens examined herein are included.

Classification

The following 19 named species are recognized as valid:

Elachista dispunctella (Duponchel, 1843)
Elachista dalmatiensis Traugott-Olsen, 1992
Elachista grandella Traugott-Olsen, 1992
Elachista parvula Parenti, 1978
Elachista moroccoensis Traugott-Olsen, 1992
Elachista anitella Traugott-Olsen, 1985
Elachista maboulella Chrétien, 1915
Elachista disemiella Zeller, 1847
Elachista tribertiella Traugott-Olsen, 1985
Elachista glaseri Traugott-Olsen, 1992
Elachista hispanica Traugott-Olsen, 1992
Elachista berndtiella Traugott-Olsen, 1985
Elachista triseriatella Stainton, 1854
Elachista andorraensis Traugott-Olsen, 1988
Elachista elsaella Traugott-Olsen, 1988
Elachista arenbergeri Traugott-Olsen, 1988
Elachista deresyensis Traugott-Olsen, 1988
Elachista oukaïmedenensis Traugott-Olsen, 1988
Elachista galactitella (Eversmann, 1844)

Key to the species

The genitalia of the single known specimen of *E. andorraensis* are incomplete, disabling its differentiation from *E. triseriatella*. In the material examined there are two additional taxa that potentially belong to unnamed species. They are included in the key as well. Some species seem to differ from others only by morphology of one sex; therefore both male and female characters are used as intermixed in the key.

- | | | |
|----|---|--|
| 1. | Forewing fringe scales distally grey at termen | 2 |
| - | Forewing fringe scales white, sometimes with single dark grey or brown tips of otherwise white scales. | 3 |
| 2. | Juxta lobes with at least 5 distinct setae; female bursa oval | <i>E. disemiella</i> |
| - | Juxta lobes without, or with at most two small setae; female bursa divided into two portions separated by median narrowing. | <i>E. maboulella</i> |
| 3. | Digitate process twice as long as juxta lobes | <i>E. parvula</i> , <i>E. moroccoensis</i> |
| - | Digitate process at most as long as juxta lobes | 4 |
| 4. | Phallus longer than valva | <i>E. hispanica</i> |
| - | Phallus at most as long as valva | 5 |
| 5. | Uncus lobes narrow, three times as long as wide | <i>E. triseriatella</i> , <i>E. andorraensis</i> |
| - | Uncus lobes at most twice as long as broad | 6 |

6.	Phallus with curved apex.	7
-	Phallus with straight-cut apex.	12
7.	Digitate process laterally oriented.	8
-	Digitate process posteriorly oriented.	9
8.	Forewing unicolorous; uncus lobes twice as long as broad.	<i>E. galactitella</i>
-	Forewing scattered with brown scales; uncus lobes as long as broad.	<i>E. deresyensis</i>
9.	Length of phallus 5/6 of valva; juxta lobes as long as digitate process.	<i>E. berndtiella</i>
-	Length of phallus at most 2/3 of valva; juxta lobes shorter than digitate process.	10
10.	Digitate process elongate, at least three times as long as wide.	<i>E. elsabella</i>
-	Digitate process broad and triangular, length at most twice its width at base.	11
11.	Juxta lobes reduced.	<i>E. oukaimedenensis</i>
-	Juxta lobes developed, as large as digitate process.	<i>E. sp. nr. E. elsabella</i>
12.	Juxta lobes longer than uncus lobes.	<i>E. berndtiella</i>
-	Juxta lobes shorter than uncus lobes.	13
13.	Uncus lobes laterally produced, elongate, with pointed apex.	<i>E. arenbergeri</i>
-	Uncus lobes posteriorly directed, with rounded or at most slightly lateroposteriorly conical apex.	14
14.	Phallus as long as valva.	<i>E. dispunctella</i>
-	Phallus shorter than valva.	15
15.	Valva somewhat S-shaped, narrowest medially; phallus basally broader than apically.	<i>E. glaseri</i>
-	Valva straight or parallel-sided; phallus slender, near parallel-sided.	16
16.	Uncus lobes as long as broad.	<i>E. anitella</i>
-	Uncus lobes longer than broad.	17
17.	Valva 3X as long as its width basally.	<i>E. grandella</i> , <i>E. sp. nr. grandella</i>
-	Valva 4X as long as its width basally.	18
18.	Valva 4X as long as digitate process.	<i>E. dalmatiensis</i>
-	Valva 5X as long as digitate process.	<i>E. tribertiella</i>

***Elachista dispunctella* (Duponchel, 1843)**

Figs. 2–13, 59–69, 126

Oecophora dispunctella Duponchel, 1842 [1843]: 333. [East Austria].

Elachista cahorsensis Traugott-Olsen, 1992: 226. **Syn. nov.**

Elachista imbi Traugott-Olsen, 1992: 227. **Syn. nov.**

Elachista karsholti Traugott-Olsen, 1992: 234. **Syn. nov.**

Elachista mannella Traugott-Olsen, 1992: 204. **Syn. nov.**

Elachista multipunctella Traugott-Olsen, 1992: 205. **Syn. nov.**

Elachista pocopunctella Traugott-Olsen, 1992: 242. **Syn. nov.**

Elachista povolnyi Traugott-Olsen, 1992: 241. **Syn. nov.**

Elachista punctella Traugott-Olsen, 1992: 209. **Syn. nov.**

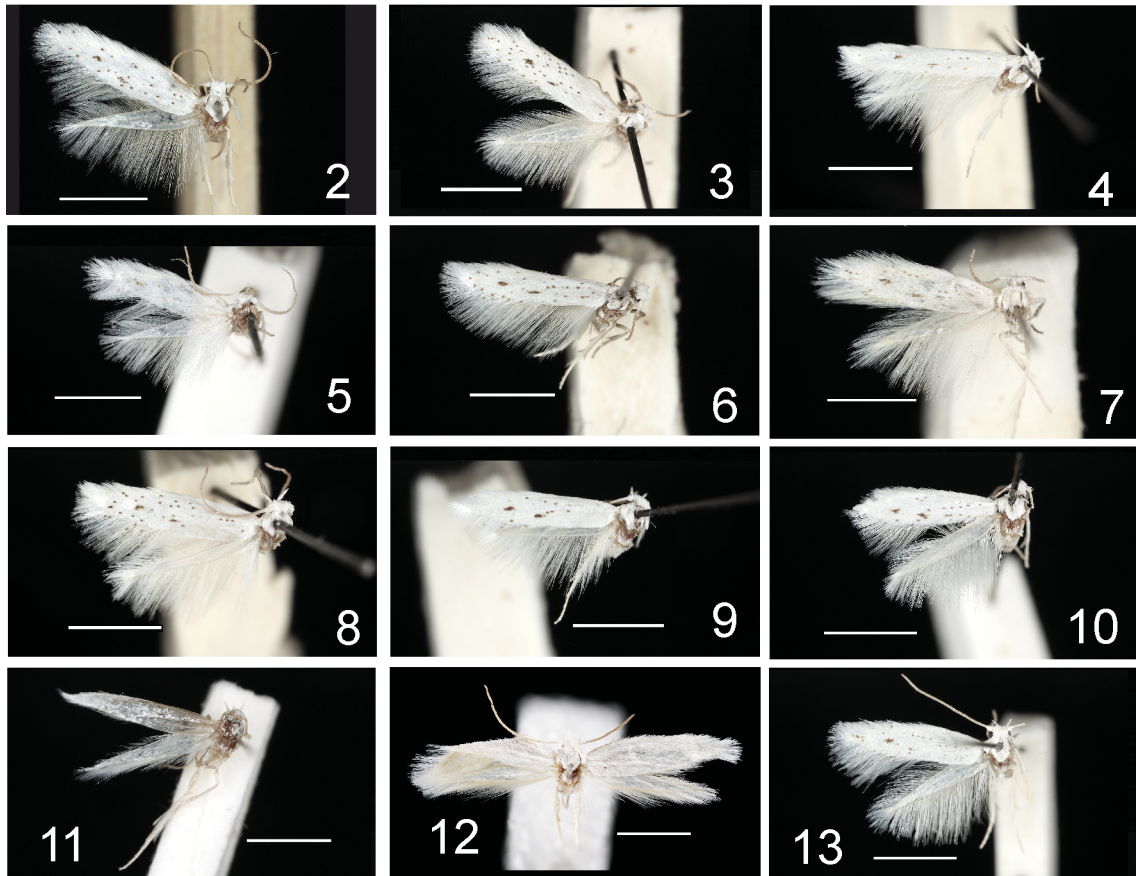
Elachista hallini Traugott-Olsen, 1992: 202. **Syn. nov.**

Elachista intrigella Traugott-Olsen, 1992: 233. **Syn. nov.**

Elachista skulei Traugott-Olsen, 1992: 206. **Syn. nov.**

Elachista nielspederi Traugott-Olsen, 1992: 250. **Syn. nov.**

Material studied. Type material. Holotype ♂ of *E. cahorsensis*, labelled: Type [rounded with red margin]; [Germany] Kyffhäuser, Kattenberg, Lichtfang, 17.8.1936 E. Jäckh; Genital praeparat nr. 6033 sex: ♂ TYPE E. Traugott-Olsen; wing praeparat nr. 6034 sex: ♂ E. Traugott-Olsen; *Elachista cahorsensis* sp. n. det. E. Traugott-Olsen (ZMUC). Holotype ♂ of *E. imbi* labelled: Type [rounded with red margin]; Genital praeparat nr. E.20.2.90 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. A.1.7.91 sex: ♂ E. Traugott-Olsen; Austria inf. or. Hundsheimer Berg, Porta hungarica, 27.IV. 1973 Kasy leg.; *Elachista imbi* sp. n. det. Traugott-Olsen; DNA sample 16863 Lepid. Phyl. (NHMW). Holotype ♂ of *E. karsholti*, labelled: Type [rounded with red margin]; Genital praeparat nr. D.7.9.86 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. C.22.1.87 sex: ♂ E. Traugott-Olsen; Austria inf. Glaslauerriegel, Gumpoldskirchen, 22.V.1971 F. Kasy leg.; *Elachista karsholti* sp. n. det. Traugott-Olsen; DNA sample 16861 Lepid. Phyl. (NHMW). Holotype ♂ of *E. mannella* labelled: Type [rounded with red margin]; Genital praeparat nr. B.12.9.86 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. A.26.3.87; Austr[ia] Mn [Mann]; *Elachista mannella* sex: ♂ E. Traugott-Olsen; sp. n. det. Traugott-Olsen (NHMW). Holotype ♂ of *E. multipunctella*, labelled: Type [rounded with red margin]; Genital praeparat nr. 5209 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. D.28.1.87 sex: ♂; E. Traugott-Olsen; 31.IV.1975 Hundsheimer berg, Porta hungarica, Austria



FIGURES 2–13. External appearance of *E. dispunctella* (Duponchel), all males. 2. holotype of *E. cahorsensis* Traugott-Olsen. 3. holotype of *E. imbi* Traugott-Olsen. 4. holotype of *E. karsholti* Traugott-Olsen. 5. holotype of *E. mannella* Traugott-Olsen. 6. holotype of *E. multipunctella* Traugott-Olsen. 7. holotype of *E. pocopunctella* Traugott-Olsen. 8. holotype of *E. povolnyi* Traugott-Olsen. 9. holotype of *E. punctella* Traugott-Olsen. 10. holotype of *E. intrigella* Traugott-Olsen. 11. holotype of *E. skulei* Traugott-Olsen. 12. *E. dispunctella* (from type locality of *E. skulei*, Greece). 13. holotype of *E. nielspederi* Traugott-Olsen. Scale bar 2 mm.

inf. or. Kasy; *Elachista multipunctella* sp. n. det. E. Traugott-Olsen DNA sample 16833 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. pocopunctella*, labelled: Type [rounded with red margin]; Genital praeparat nr. E.9.9.86 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. D.26.1.87 sex: ♂ E. Traugott-Olsen; [Austria]: Predota, Wien, Mödling leg.; *Elachista pocopunctella* sp. n. det. E. Traugott-Olsen (NHMW). Holotype ♂ of *E. povolnyi*, labelled: Type [rounded with red margin]; Genital praeparat nr. A.7.9.86 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. D.9.1.87 sex: ♂ E. Traugott-Olsen; Austria inf. Glaslauerriegel, südl. Gumpoldskirchen 1.V.1976 F. Kasy leg.; *Elachista povolnyi* sp. n. det. E. Traugott-Olsen; DNA sample 16857 Lepid. Phyl. (NHMW). Holotype ♂ of *E. punctella* labelled: Type [rounded with red margin]; Genital praeparat nr. B.20.2.80 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. C.4.3.87 sex: ♂ E. Traugott-Olsen; Austria inf., Hundsheimer Berg, Porta hungarica 23.7.1977 F. Kasy leg.; *Elachista punctella* sp. n. det. E. Traugott-Olsen (NHMW). Holotype ♂ of *E. hallini*, labelled: Type [rounded with red margin]; Genital praeparat nr. D.5.9.86/ETO sex: ♂ E. Traugott-Olsen; Wing praeparat nr. E.27.1.87/ETO; Austria inf. NO v. Dürnstein, Wachau 21.V.1957 leg. F. Kasy; *Elachista hallini* sp. n. det. Traugott-Olsen (NHMW). Holotype ♂ of *E. intrigella*, labelled: Type [rounded with red margin]; Genital praeparat nr. K.7.9.86 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. A.9.1.87 sex: ♂ E. Traugott-Olsen; Austria inf. or. Hundsheimer Berg, Porta hungarica, 27.VII. 1978 Kasy leg.; *Elachista intrigella* sp. n. det. Traugott-Olsen; DNA sample 16858 Lepid. Phyl. (NHMW). Holotype ♂ of *E. skulei*, labelled: Type [rounded with red margin]; Genital praeparat nr. F 15.3.85 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. A.15.1.90 sex: ♂ E. Traugott-Olsen; Hellas, Lakonia, Mt. Taygetos, 1700 m, 28.–29.VI.1982 leg. B. Skule & S. Langemark; *Elachista skulei* sp. n. det. E. Traugott-Olsen; DNA sample 16834 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. nielspederi*, labelled: Type [rounded with red margin]; Genital praeparat nr. A.5.9.86 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. D.26.1.87 sex: ♂ E.



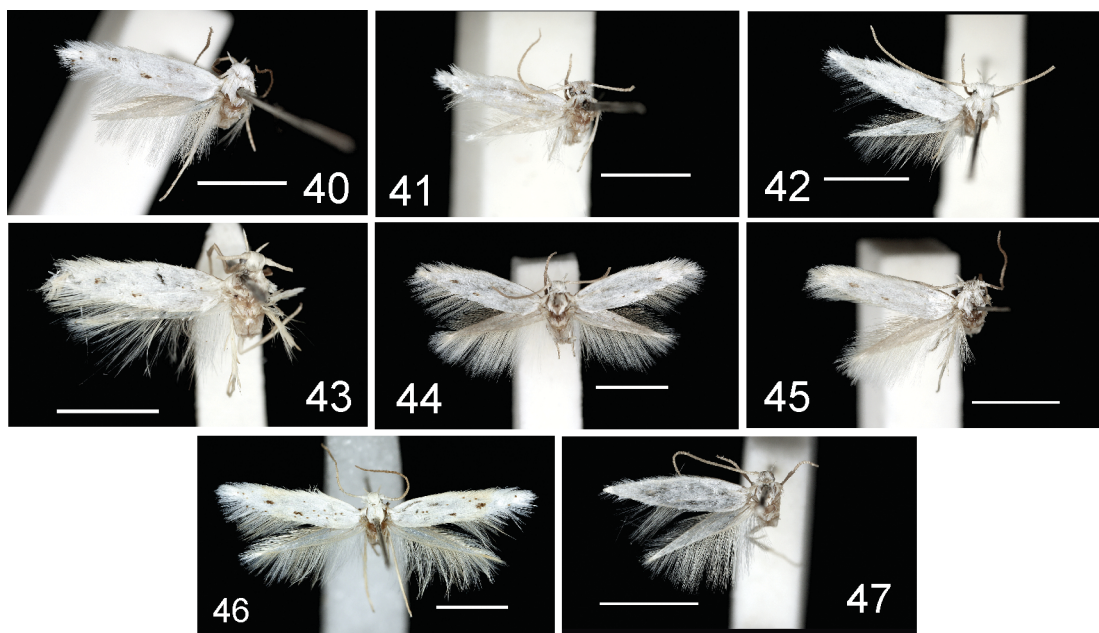
FIGURES 14–24. External appearance of *Elachista* spp. males. 14. *E. dalmatiensis* Traugott-Olsen, holotype. 15. *E. grandella* Traugott-Olsen (Hungary). 16–19. *E. parvula* Parenti. 16. ♂ (Liguria, from type locality). 17. *E. parvula* Parenti ♀ (Greece). 18. *E. minusculella* Traugott-Olsen, holotype. 19. *E. blancellata* Traugott-Olsen, holotype. 20. *E. moroccoensis* Traugott-Olsen, holotype. 21. *E. anitella* Traugott-Olsen, holotype. 22–24. *Elachista maboulella*, all males. 22. *E. catalunella* Traugott-Olsen, holotype. 23. *E. gerdmaritella* Traugott-Olsen, holotype. 24. *E. gielisi* Traugott-Olsen, holotype. Scale bar 2 mm.

Traugott-Olsen; Austria inf., Hundsheimer Berg S., Porta hungarica 1.VIII.1970 F. Kasy leg. *Elachista nielspederi* sp. n. det. E. Traugott-Olsen; DNA sample 16860 Lepid. Phyl. (NHMW). **Other material.** **Austria:** 4749'N 1612'E, Neustadt West, (Halb)-Trockenrasen z. T. verbuschend, 280 m, 19.V.2006–8, 1 ♀, P. Buchner leg., 2823 Pitten 386, L. Kaila prep. 5724, DNA sample 16995 (TLMF); Austria, inf. Dürnstein, 1.V.1937, 3 ♂, J. Klimesch leg., L. Kaila prep. 5837 (ZSM); Teriolis mer. Naturns. p. meran, 20–30.VI.1935 J. Klimesch leg. (ZSM). **Croatia:** South Velebit, 15.VIII.2003, 1 ♂, L. Šrnka leg., L. Kaila prep. 5446, DNA sample 21356 (Coll. Tokár). **France:** Alpes Maritimes, St. Barnab, Col de Veuce, 900 m, 2–7.VII.1962, 1 ♂, Arenberger leg., L. Kaila prep. 5735, Coll. Glaser (SMNK); Var Garces, 5 km SE Le Lac, 21.IV.2003, 1 ♂, J. Junnilainen leg. (Coll. Junnilainen). **Germany:** Rheinland-Pfalz, Mittelrhein, Bornich, 16.V., 1 ♂, 1 ♀, W. Biesenbaum leg., *Elachista grandella* Tr.O. det E. Traugott-Olsen, DNA samples 22101, 22102 (ZMUC). **Great Britain:** Cornwall, SW698475, Chapel Port, 15.VI.1984, 1 ♂, R. J. Heckford leg., L. Kaila prep. 3936, DNA sample 11352 Lepid. Phyl. (MZH); Cornwall, Dornas Valley, SW7638916833, VC1, *Festuca rubra*, coll. 19.VII.2008, em. 1.XI.2008, 1 ♂, R. J. Heckford leg., J. Tabell prep. 4698, DNA sample 20049 Lepid. Phyl. (Coll. Tabell). **Greece:** Lakonia, Paeopanagia, 12 km S. Sparti, 350 m, 23.VII.1998, 1 ♂, B. Skule & D. Nilsson leg., L. Kaila prep. 3048 (ZMUC). **Hungary:** Cskberény, 26.V.2004, 2 ♂, Z. Tokr leg., L. Kaila prep. 4380, 5843 DNA sample 21379 (Coll. Tokár); Cskberény, Bucka-Hegy, 11.V.2007, 1 ♂, Z. Tokár leg., L. Kaila prep. 5833 (Coll. Tokár). **Kazakhstan:** 48°38'39"N, 57°54'57"E, Kumzhargan sands by Emba river, 200 m, 5.VI.2011, 1 ♂, K. Nupponen leg., DNA sample 22512 (MZH); 25.IV.2012, 9 ♂, 1 ♀, K. Nupponen leg. (Coll. Nupponen); 48°33'N, 57°36'E, Kumzhargan sands by Emba river, nr. Zhagabulak vill., 17.V.2012, 4 ♂, 25.IV.2012, 1 ♂, L. Kaila prep. 5919 K. Nupponen leg. (Coll. Nupponen, MZH); 190 m, 110 km N Aralsk village, 47°43'N, 61°27'E, Terektikum sands, 100 m, 15.V.2012 1 ♂ K. Nupponen

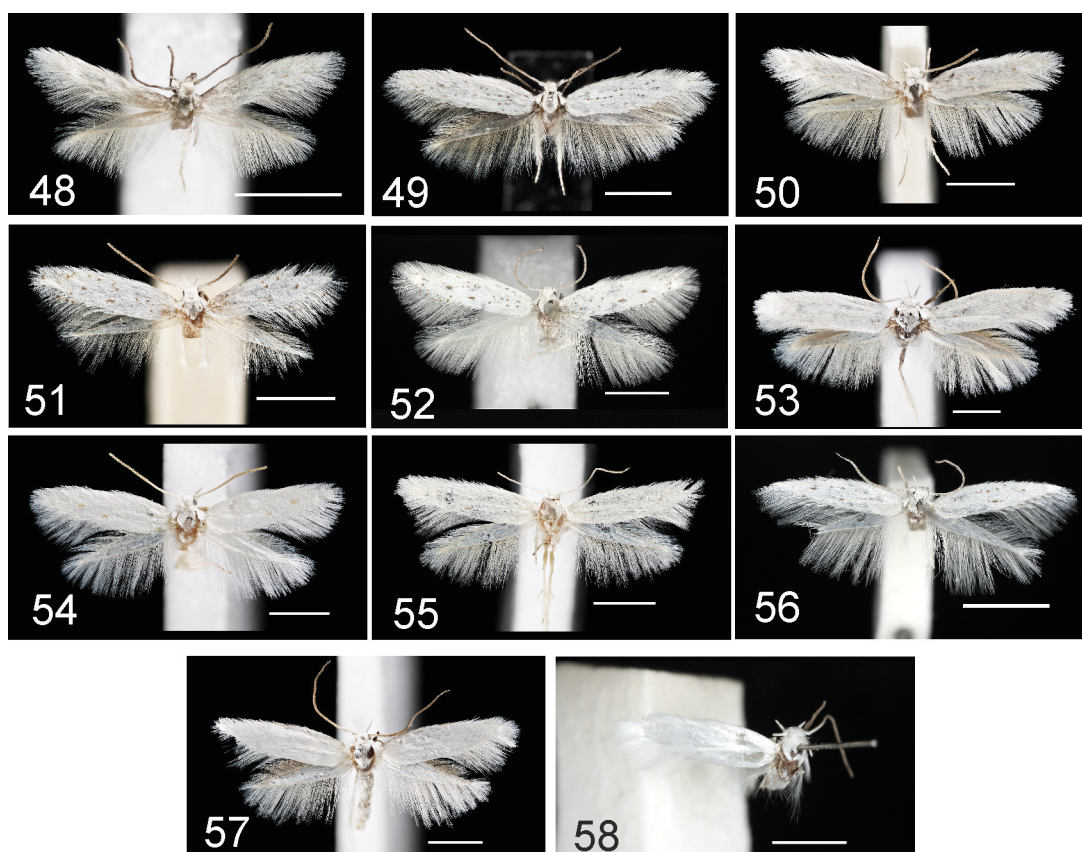
leg. (Coll. Nupponen); 47°26'N, 60°49'E Malye Barsuki Sands, 150 m, 5 km NW Karchokat village 14.V.2012 2 ♂ K. Nupponen leg. (Coll. Nupponen). **Latvia:** Carnikava 2.VI.2000 4 ♂ J. Junnilainen leg., L. Kaila prep. 3461, 3462, DNA samples 22172, 22185 (Coll. Junnilainen). **Poland:** CD 37 Glinki n Torún, 3.V.1998, 1 ♂, L. Kaila prep. 4239, DNA sample 11350 Lepid. phyl.; 14.V. 1999, 1 ♂, T. Baran leg., L. Kaila prep. 4330, DNA sample 11351 Lepid. Phyl. (MZH). **Russia:** Volgograd obl., 80 km N Volgograd, nr. Ilovla village, 2.VI.2001, 5 ♂, 2 ♀, K. Nupponen leg., L. Kaila prep. 3439, 3440, 5735, 5726, DNA samples 11379, 11381 Lepid. Phyl. (Coll. Nupponen, MZH); Volgograd obl., 20 km SW Frolovo vill., 16.V.2005, 2 ♂, K. Nupponen leg., DNA sample 11380 Lepid. Phyl. (Coll. Nupponen); S. Ural, Orenburg district, nr. Burannoe village, 12.V.2005, 4 ♂, K. Nupponen leg., L. Kaila prep. 4839, 4840, DNA samples 11382, 11383 Lepid. Phyl. (Coll. Nupponen). **Slovakia:** D Vestenice Šiare, 29.V.1998, 1 ♂, I. Richter leg., L. Kaila prep. 4379, DNA sample 21378 Lepid. Phyl. (Coll. Tokár); Čenkovska step, 11.V.1991, 1 ♂, Z. Tokár leg. L. Kaila prep. 5482, DNA sample 21431 (Coll. Tokár); Streda n/Bodr., 28.V.1999, 1 ♂, Z. Tokár leg. (Coll. Tokár). **Turkey:** Ivriz/Eregli, 1200 m, Bolkar Daglari, 24.VI.1968, 1 ♂, M. V. Glaser leg. (SMNK). **Ukraine:** Crimea, Karadagh, 21.IV.1990, 2 ♂, 28.VII.1990, 1 ♂, 4.VI.1991, 1 ♂, L. Kaila prep. 3421, DNA sample 11336 Lepid. phyl., 27.V.1993, 1 ♂, 12.VII.1993, 1 ♂, L. Kaila prep. 3423, DNA sample 11338 Lepid. Phyl., all Yu. Budashkin leg. (MZH); Stanitschno-Luganskoe, 15.V.2000, 1 ♂, A. Bidzilya leg. (ZMKU).



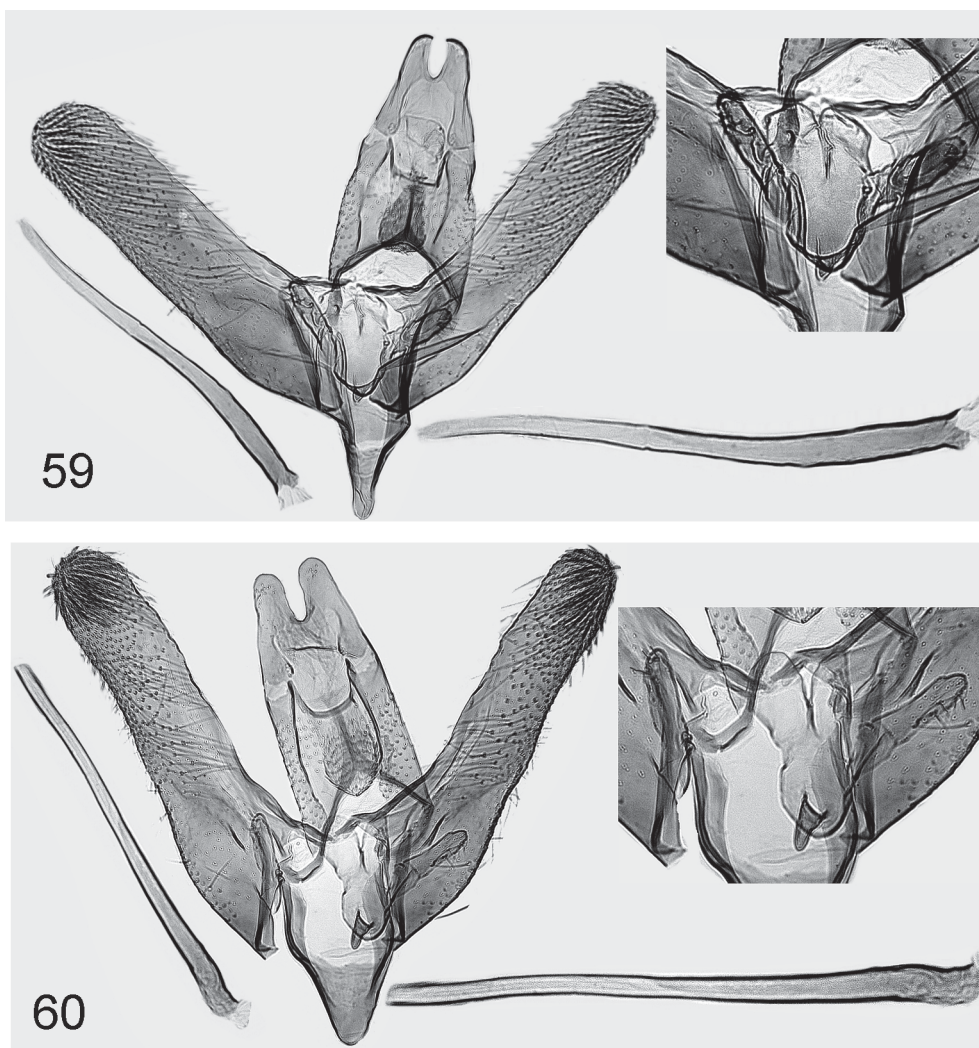
FIGURES 25–39. External appearance of *Elachista* spp. 25–30. *E. tribertiella* Traugott-Olsen, all males. 25. *E. tribertiella*, holotype. 26. *E. toveella* Traugott-Olsen, holotype. 27. *E. baldizonella* Traugott-Olsen, holotype. 28. *E. veletaella* Traugott-Olsen, holotype. 29. *E. bazaella* Traugott-Olsen, holotype. 30. *E. louiseae* Traugott-Olsen, holotype. 31. *E. disemiella* Zeller, lectotype. 32–39. *E. glaseri* Traugott-Olsen (all males). 32. *E. glaseri* Traugott-Olsen, holotype. 33. *E. rikkeae* Traugott-Olsen, holotype. 34. *E. olemartini* Traugott-Olsen, holotype. 35. *E. bengtssoni* Traugott-Olsen, holotype. 36. *E. senecai* Traugott-Olsen, holotype. 37. *E. wadielhiraensis* Traugott-Olsen, holotype. 38. *E. rissaniensis* Traugott-Olsen, holotype. 39. *E. michelseni* Traugott-Olsen, holotype. Scale bar 2 mm.



FIGURES 40–47. External appearance of *Elachista* spp. 40–45. *E. hispanica* Traugott-Olsen, holotype. 41. *E. vivesi* Traugott-Olsen, holotype. 42. *E. vanderwolffi* Traugott-Olsen, holotype. 43. *E. amparoae* Traugott-Olsen, holotype. 44. *E. varensis* Traugott-Olsen, holotype. 45. *E. occidentella* Traugott-Olsen, holotype. 46–47. *E. berndtiella* Traugott-Olsen. 46. *E. berndtiella* Traugott-Olsen, holotype. 47. *E. casascoensis* Traugott-Olsen, holotype. Scale bar 2 mm.



FIGURES 48–58. External appearance of *Elachista* spp. 48–50. *E. triseriata* Stainton. 48. ♂ (Denmark). 49. ♂ (Spain). 50. *E. gregori*, holotype. 51–52. *E. elsaella* Traugott-Olsen. 51. ♂ (Sweden, Högsby, type locality of *E. elsaella*). 52. *E. svenssoni* Traugott-Olsen, holotype. 53. *E. arenbergeri* Traugott-Olsen, ♂ (Tunisia). 54–55. *E. deresyensis* Traugott-Olsen. 54. ♂ (Turkey). 55. ♀ (Turkey). 56. *E. oukaïmedenensis* Traugott-Olsen, holotype. Figures 57–58. *E. galactitella* (Eversmann). 57. ♂ (Ural, near type locality). 58. *E. madridensis* Traugott-Olsen, holotype. Scale bar 2 mm.



FIGURES 59–60. Male genitalia of *Elachista dispunctella* (Duponchel). 59. Poland. 60. Russia, Volgograd.

Diagnosis. Externally, *E. dispunctella* is similar to most other species in the *E. dispunctella* complex with unicolorous forewing fringe. Therefore examination of the genitalia is necessary for its identification. *E. dispunctella* belongs to those species that have a nearly straight and narrow, elongate phallus. The phallus length of *E. dispunctella* is about equal to that of valva, distinguishing it from the similar, possibly sympatric species: the phallus of *E. dalmatiensis* and *E. grandella* is shorter than the valva, that of *E. hispanica* is significantly longer than valva. The juxta lobes are devoid of setae. The female genitalia are characterized by the corpus bursae which has a conspicuous appendix bursae. Among the species with an appendix bursae, the shape and size of it is fairly equal to that of *E. dispunctella* only in *E. maboulella*. The corpus bursae of *E. maboulella* is, however, smaller than that of *E. dispunctella*.

Biology. According to Heckford (2010), *E. dispunctella* often inhabits serpentine and limestone sites where its hostplant *Festuca rubra* L. (Poaceae) grows in England.

Distribution. Austria, Croatia, England, France, Germany, Hungary, Kazakhstan, Latvia, Poland, Russia, Slovakia, Turkey, and Ukraine.

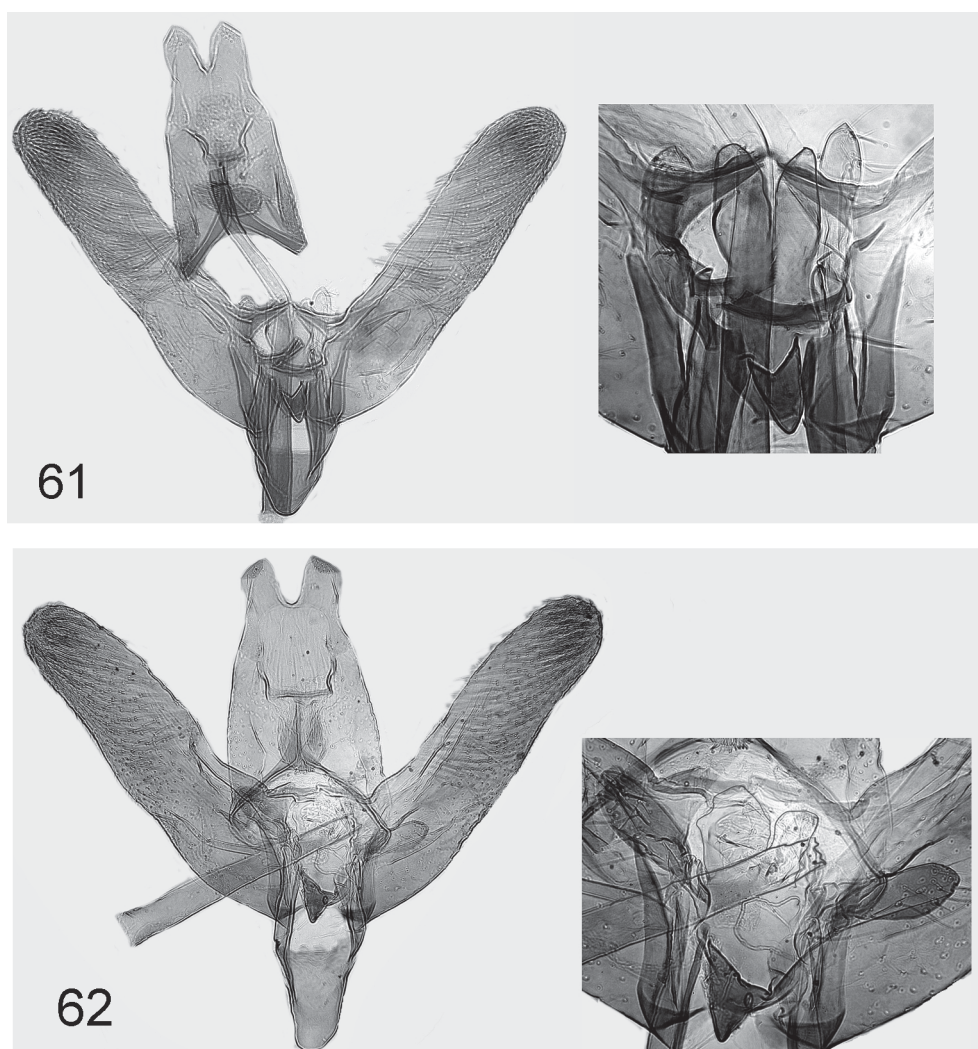
Remarks. According to Stainton (1858), Vienna and Ratisbon (now Regensburg) are mentioned as the distribution of *E. dispunctella*; the latter does not match Duponchel's original account which implies eastern Austria to be the origin of the type series, so the original material likely originates from the Vienna region.

The lectotype of *E. dispunctella*, in Musée Nationale d'Histoire Naturelle, Paris, is lacking the abdomen. Therefore its identification is not possible, in particular as several species of the *E. dispunctella* complex occur in the area of its collecting site (eastern Austria). Of these, *E. grandella* can be ruled out due to its larger size. The other known alternatives are the taxa listed here as synonyms of *E. dispunctella*, as well as *E. dalmatiensis*, whose

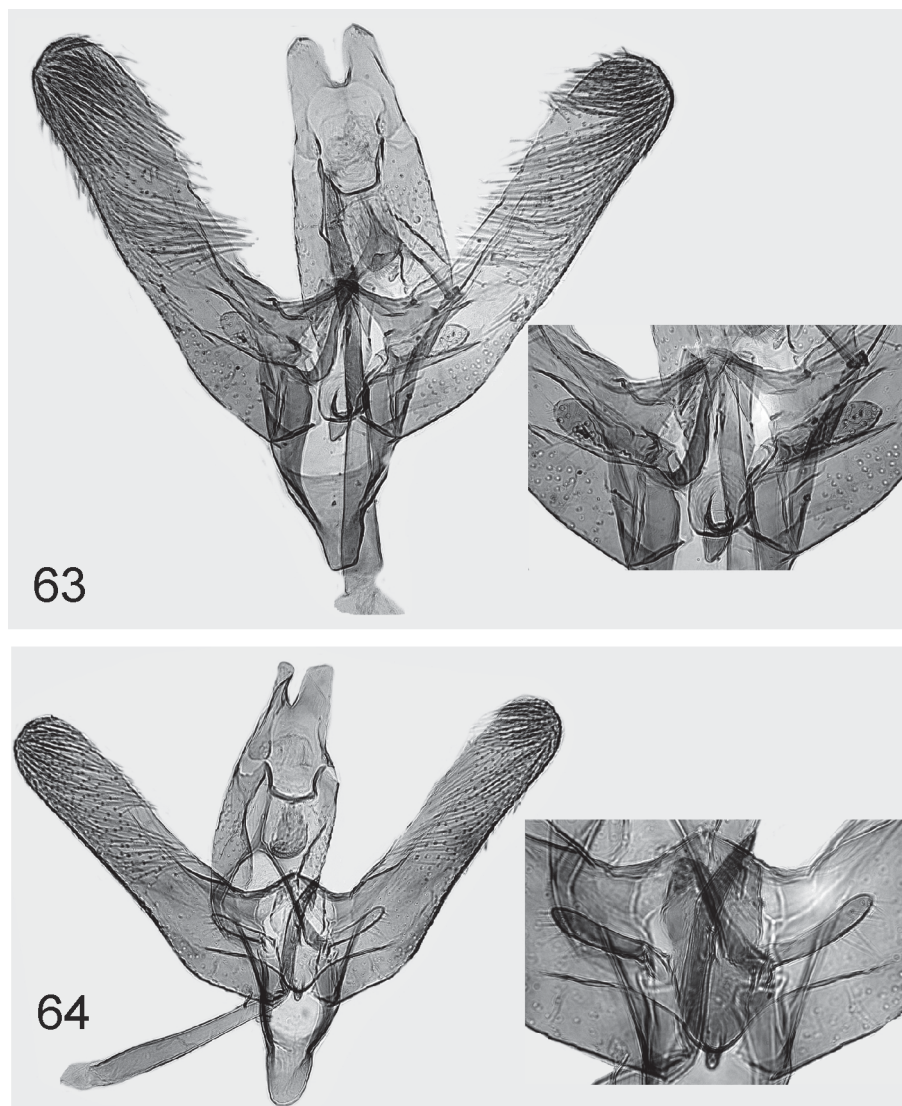
male genitalia are depicted as representing *E. dispunctella* in Traugott-Olsen (1992). The collecting site of that specimen is not mentioned. Traugott-Olsen lists, besides Austrian localities, also Macedonia: Skopje in the *E. dispunctella*, material studied by him. This locality would be within the verified range of *E. dalmatiensis* of which no Austrian specimen was found in the present study. Until the genitalia slide from which the illustration was made has been examined, its origin remains unclear. It is probably impossible to establish with certainty what is the ‘real’ *E. dispunctella*, but the acquired knowledge and conformity of nomenclature in reviews and regional checklists predating, and to some extent also persisting after Traugott-Olsen (1992) are here used as guidelines in the decision of the identity of this name.

The barcode of the *E. skulei* holotype is slightly different from other specimens, including holotypes of several nominal species grouped with *E. dispunctella* (difference to closest *E. dispunctella* 1.9%). This difference is minor, possibly due to its somewhat distant collecting site from other samples of the widespread *E. dispunctella*. In the absence of any other differentiating characters between the *E. dispunctella* and *E. skulei*, they are considered conspecific.

E. dispunctella is referred to as OTU 8 in Mutanen *et al.* (2015). The record of *E. grandella* from Germany (Biesenbaum 1995) is here interpreted to represent *E. dispunctella*, as the phallus/valva length ratio in the genital illustration of the German specimen matches *E. dispunctella*, not *E. grandella*.



FIGURES 61–62. Male genitalia of *Elachista dispunctella* (Duponchel). 61. *E. cahorsensis* Traugott-Olsen, holotype. 62. *E. imbi* Traugott-Olsen, holotype [phallus broken].



FIGURES 63–64. Male genitalia of *Elachista dispunctella* (Duponchel). 63. *E. karsholti* Traugott-Olsen, holotype. 64. *E. multipunctella* Traugott-Olsen, holotype.

***Elachista dalmatiensis* Traugott-Olsen, 1992**

Figs. 14, 70–71

Elachista dalmatiensis Traugott-Olsen, 1992: 219.

Material studied. Type material. Holotype ♂ labelled: Type [rounded with red margin]; Dalmatien [Croatia] Umg. Dubrovnik 19.–23.9.1970 leg. M. u. W. Glaser; Genital praeparat nr. C. 24.11.86 sex ♂ E. Traugott-Olsen; Akvarel 30.11.86 E. Traugott-Olsen; *Elachista dalmatiensis* sp. n. det. E. Traugott-Olsen (ZMUC). **Other material. Bulgaria:** 42°163'N, 23°213'E, Blagoevgrad, 5 km NNE Pastra, Rila Mts., 1800 m, south slope, 31.VII.2013, 3 ♂, B. Bengtsson leg., B. Bengtsson prep. 6321 (Coll. Bengtsson). **Croatia:** Gospić, 15.IX.2007, 2 ♂, Z. Tokár leg., L. Kaila prep. 5750, DNA samples 19979, 19980 Lepid. Phyl. (Coll. Tokár). **Greece:** Corfu, Benitses, 6–14.VI.1978, 1 ♂, V. Varis leg., L. Kaila prep. 2205 (MZH); Lakonia, Taygetos Mts. W., 1000–1500 m, 3.VI.1984, 1 ♂, O. Karsholt leg., L. Kaila prep. 4688 (ZMUC); Prov. Joannina, Mt. Pindos, 750 m, 2 km W Agia Paraskevi, 27–20.VIII.2011, T. Nupponen leg. (Coll. Nupponen); Makedonia, Olympos, 750 m, 15 km W Leptokaria, 18–21.V.2003, 1 ♂, J. Junnilainen leg., L. Kaila prep. 5423, DNA sample 21395 Lepid. Phyl. (Coll. Junnilainen); Peloponisos, Arkadia Vitina 23.VI.1981 1 ♂ P. Grotenfelt leg., L. Kaila prep. 4708 (MZH); Pindos

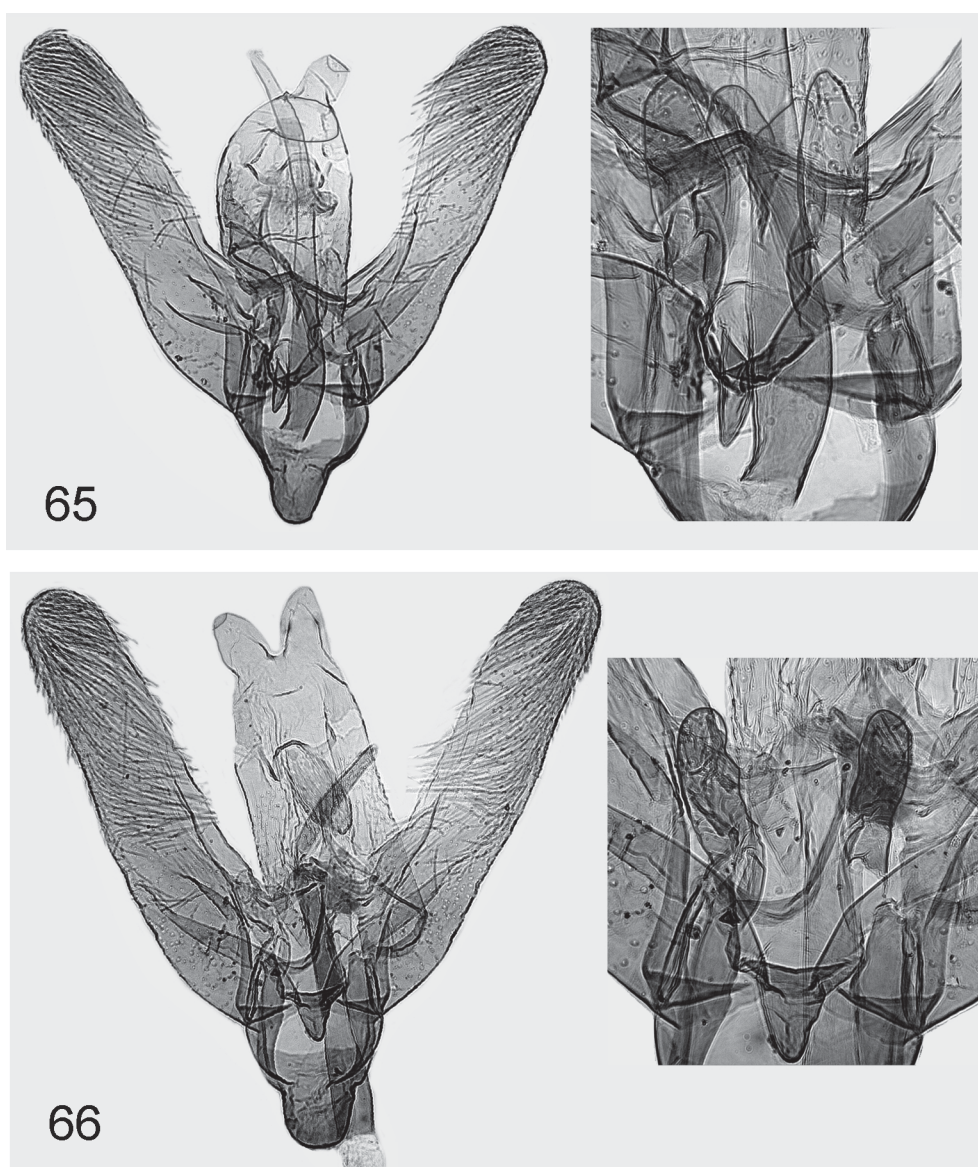
Konitsa, Pades 6.VII.1981 6 ♂ P. Grotenfelt leg., L. Kaila prep. 4572, 4707, 4712, 4713, 1718, 4720 (MZH).
Turkey: Ivriz/Eregli, 1200 m, Sultan Daglari, 24.VI.1968, 1 ♂, M. u. W. Glaser leg., L. Kaila prep. 5734 (SMNK).

Diagnosis. *E. dalmatiensis* is similar to *E. dispunctella* and *E. grandella*. The phallus is longer in *E. dispunctella* as compared to *E. dalmatiensis* and *E. grandella*, with its length equal to the length of the valva. The phallus is shorter than the valva in both *E. dalmatiensis* and *E. grandella*. *E. grandella*, a poorly known species, is large, with a wingspan of 11–12 mm, as compared to *E. dispunctella* and *E. dalmatiensis* whose wingspans range from 7–9 mm, and its valva is broader than in *E. dalmatiensis*. The female is unknown.

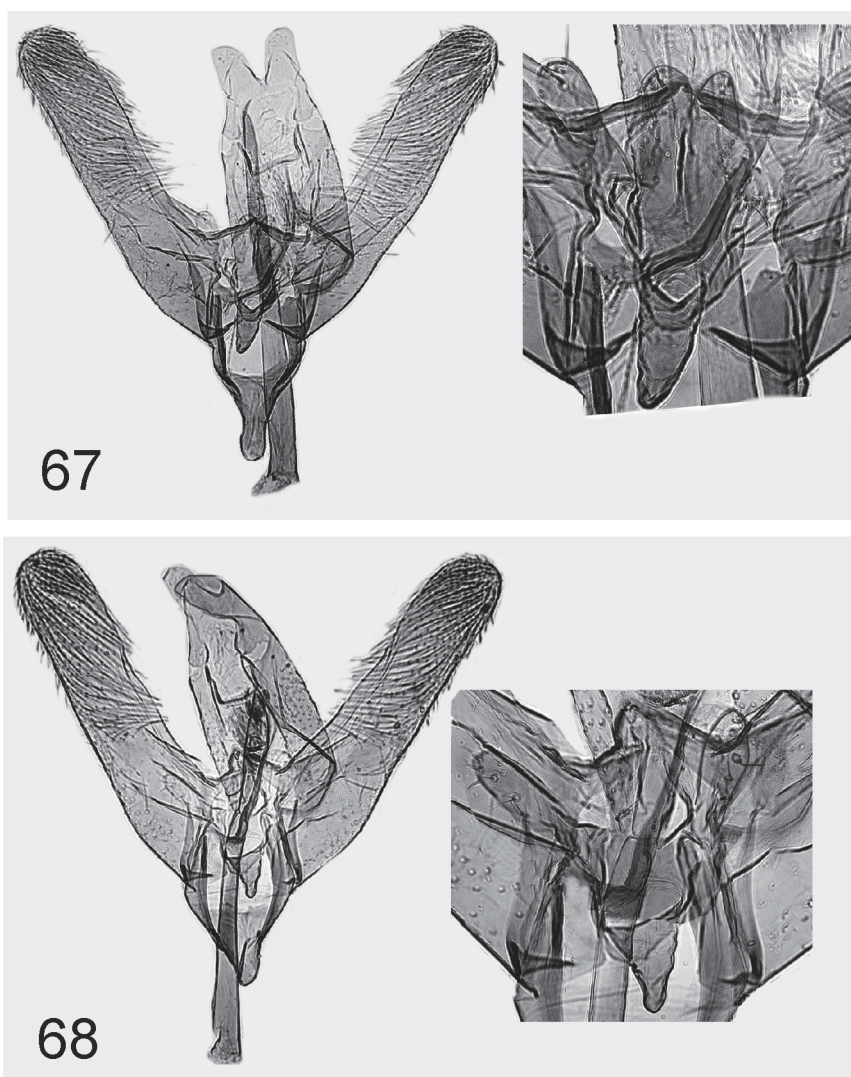
Biology. Unknown.

Distribution. Bulgaria, Croatia, Greece, Turkey. Traugott-Olsen's (1992) records from Austria require verification.

Remarks. The DNA barcode of *E. dalmatiensis* differs 10% from that of the closest haplotype of *E. dispunctella*. The closest match with DNA barcode is *E. disemiella* with 7% divergence. On the basis of the barcode divergence, in combination with the morphological differentiation (see diagnosis), *E. dalmatiensis* is here considered a valid species. See also remarks on *E. grandella*. *E. dalmatiensis* is referred to as OTU 11 in Mutanen *et al.* (2015).



FIGURES 65–66. Male genitalia of *Elachista dispunctella* (Duponchel). 65. *E. pocopunctella* Traugott-Olsen, holotype. 66. *E. povolnyi* Traugott-Olsen, holotype.



FIGURES 67–68. Male genitalia of *Elachista dispunctella* (Duponchel). 67. *E. intrigella* Traugott-Olsen, holotype. 68. *E. nielspederi* Traugott-Olsen, holotype.

***Elachista grandella* Traugott-Olsen, 1992**

Figs. 15, 72

Elachista grandella Traugott-Olsen, 1992: 224

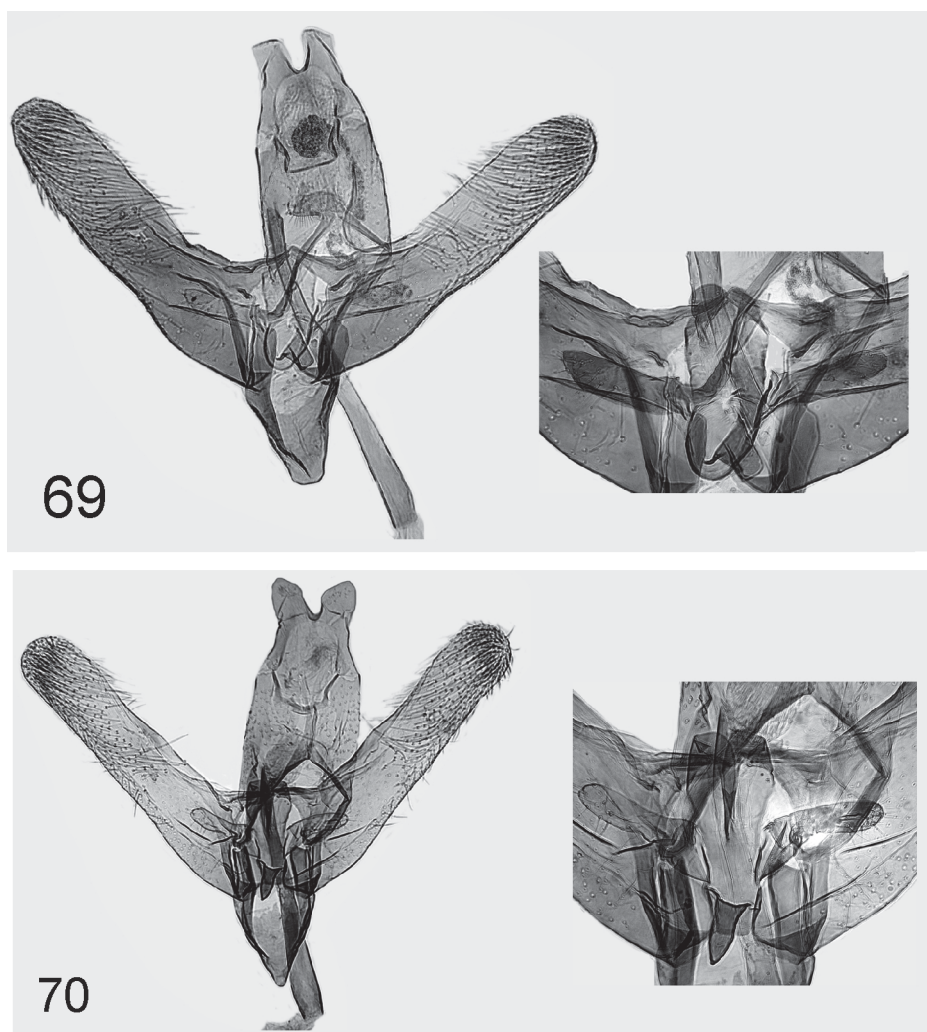
Material studied. Type material. Holotype ♂ labelled: Type [rounded with red margin]; Genital praeparat nr. C.5.9.86/ETO sex: ♂ *E. Traugott-Olsen*; Wing praeparat nr. B.25.3.87/ETO; Austria inf. Pfaffenberg, Porta hungarica, 18.V.1969 leg. F. Kasy; *Elachista grandella* sp. n. det. Traugott-Olsen (NHMW). **Other material.** **Hungary:** Nyir p. Kecskemet, 17–27.V.1937, 1 ♂, J. Klimesch leg., L. Kaila prep. 5839 (ZSM).

Diagnosis. *E. grandella* is characterized by its large size with broad wings, as well as the broad valvae. Its phallus is shorter than that of *E. dispunctella*, and similar to that of *E. dalmatiensis*. *E. grandella* and *E. dalmatiensis*, if separate, are distinguished by their size difference (wingspan 11–12 mm and 7–8 mm, respectively) and the width of the valva. Due to the paucity of specimens known, however, the level of variation is not known. The female is unknown.

Biology. Specimens have been collected in xerothermic habitats.

Distribution. Austria, Hungary.

Remarks. The record of *E. grandella* from Germany (Biesenbaum 1995) is here interpreted to represent *E. dispunctella*, as the phallus/valva length ratio in the genital illustration of the German specimen matches *E. dispunctella*, not *E. grandella*.



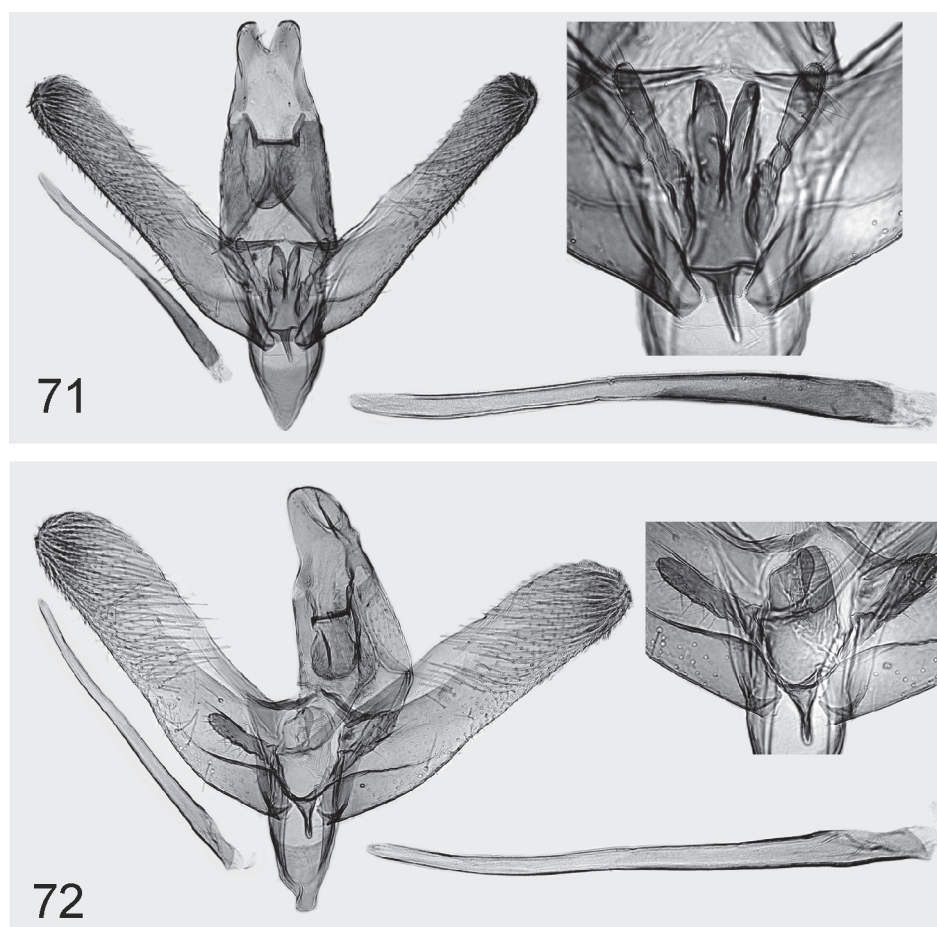
FIGURES 69–70. Male genitalia of *Elachista* spp. 69. *E. dispunctella* (Duponchel), *E. skulei* Traugott-Olsen, holotype. 70. *E. dalmatiensis* Traugott-Olsen, holotype.

***Elachista* sp. nr. *grandella* and *E. dalmatiensis* (OTU 16 in Mutanen *et al.* (2015))**

Material studied. Italy: 46°29'49"N, 13°20'47"E, prov. Udine, Valle di Uccia, 3 km N Uccia, 900 m, 1 ♂, P. Huemer leg., DNA sample 22211 Lepid. Phyl. (TLMF); 42°26.9'N, 13°34.3'E, Prov. L'Aquila NP Gran Sasso, Campo Imperatore, E Observatorio, 2010 m, 13.VII.2010, 3 ♂, P. Huemer leg., L. Kaila prep. 5831, DNA sample 22209 (TLMF). **Slovenia:** 46°26'18,7"N, 13°38'77"E, Juliske Alpe, Veliki Mangart, 1820 m, 9.VIII.2010, 15 ♂, P. Huemer leg., L. Kaila prep. 5579, 5580, 5581, 5462, DNA samples 16988, 20822, 20824–7, 20840 (TLMF).

Remarks. The barcodes of these specimens are uniform and are significantly different from other species, and form their own cluster (OTU 16 in Mutanen *et al.* (2015)). This taxon generally matches the description of *E. grandella* (barcode unknown), but seems to be somewhat smaller and more narrow-winged, also with narrower valva. These taxa differ from *E. dispunctella* by their shorter phallus as compared to the length of the valva. The relative length of the phallus to valva is also similar in the smaller *E. dalmatiensis*. It also differs markedly by its barcode. The climate of the type locality of *E. grandella* in eastern Austria and the other known locality in Hungary is dry, thus quite different from that of OTU 16 whose occurrence sites have a very high rainfall (Peter Huemer, personal communication). The samples of OTU 16 are from a distant area, separated by Alps and Balkan mountains, from the known range of *E. grandella*. Due to these reasons the association of these specimens to *E.*

grandella seems unwarranted. It is possible, and perhaps more likely, that these specimens represent an undescribed, cryptic species. The discovery of the female of *E. grandella*, *E. dalmatiensis* and OTU 16 might help to resolve the taxonomic status of these taxa.



FIGURES 71–72. Male genitalia of *Elachista* spp. 71. *E. dalmatiensis* Traugott-Olsen (Turkey). 72. *E. grandella* Traugott-Olsen, Hungary (L. Kaila prep. 5839).

***Elachista parvula* Parenti, 1978**

Figs. 16–19, 73–76, 127

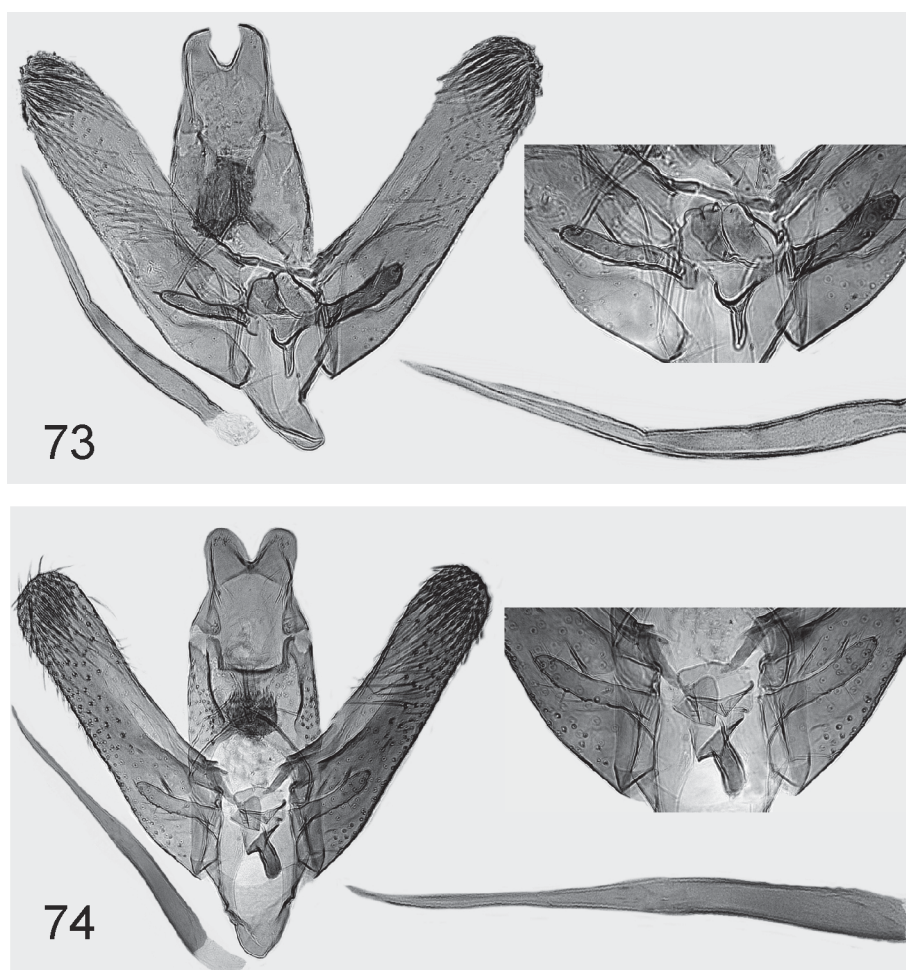
Elachista parvula Parenti, 1978: 21.

Elachista minusculella Traugott-Olsen, 1992: 215. **Syn. nov.**

Elachista blancellae Traugott-Olsen, 1992: 216. **Syn. nov.**

Material studied. Type material. Paratype slides of *E. parvula*: Italia, Liguria dintorni di Noli (Savona), U. Parenti prep. 2898, 2899 (ZSM). Holotype ♂ of *E. minusculella* labelled: Type [rounded with red margin]; Genital praeparat nr. C.11.9.87 sex: ♂ *E. Traugott-Olsen*; Wing praeparat nr. A.21.1.90 sex: ♂ *E. Traugott-Olsen*; Asia min. Turcia 50 km östl. Istanbul 6.7.65, 50 m, .M., M. u. W. Glaser leg.; *Elachista minusculella* sp. n. det. *E. Traugott-Olsen*; DNA sample MM16839 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. blancellae* labelled: Type [rounded with red margin]; Turkey: Prov. Ankara, 20 km NW Kizilcan, 1200 m, 24.7.1986 leg. M. Fibiger; Genital praeparat nr. C.27.6.90 sex: ♂ *E. Traugott-Olsen*; wing praeparat nr. A.5.7.90 sex: ♂ *E. Traugott-Olsen*; *Elachista blancellae* sp. n. det. *E. Traugott-Olsen*; DNA sample MM16872 Lepid. Phyl. (ZMUC). **Other material. France:** Pyrenees orientales, Jujois, 650 m, 16.V.2004, 1 ♂, J. Junnilainen leg., L. Kaila prep. 5360 (Coll. Junnilainen); Provence, La Bessée, 1200 m, 13.VI.1974, 4 ♂, M. u. W. Glaser leg., L. Kaila prep. 5736–8 (SMNK); Alpes maritimes, Col de Vence, 8.VI.1998, 1 ♂, K. Silvonen leg., L. Kaila prep. 4236, DNA sample 11376 (MZH); Alpes maritimes, Vallier de Thiey, 14.VIII.1996, 1 ♂, PP. Skou leg., L. Kaila prep. 5903 (ZMUC); Hautes Alpes, RN05,

1–5.VI.2003, 6 ♂, 1 ♀, J. Junnilainen leg., L. Kaila prep. 5766 (Coll. Junnilainen); Hautes Alpes, Eygliers, 25–28.VI.1985, 2 ♂, P. Stadel Nielsen leg., L. Kaila prep. 5901, 59002 (ZMUC); 5 km W Les Vigneaux, 1250 m, 5–6.VI.2003, 1 ♂, J. Junnilainen leg. (Coll. Junnilainen); Gallia mer. Mts. Luberon, La Motte d'Aigues, 21.VII.1993, 1 ♂, A. Latůvka leg, L. Kaila prep. 5765, DNA sample 22136 Lepid. Phyl. (ZMUC). **Greece:** Makedonia, Kozani, 23–24.V.2003, 2 ♂, J.-P. Kaitila leg., DNA samples Lepid. Phyl. 11347, 11348, L. Kaila prep. 4136, 4148, (Coll. Kaitila), 21–24.V.2003, 6 ♂, 2 ♀, J. Junnilainen leg., L. Kaila prep. 5801–4 (Coll. Junnilainen, (MZH), 26.IV.2006, 10 ♂, J. Junnilainen leg., DNA samples Lepid. Phyl. 05571, 05573, L. Kaila prep. 5904 J. Tabell prep. 4478, 4480 (Coll. Junnilainen, MZH); Metamorfoosi, 15 km W. Kozani, 22.V.2003, 1 ♂, J.-P. Kaitila leg., L. Kaila prep. 4149, DNA sample 11349 Lepid. Phyl. (Coll. Kaitila); Xerolimni, 15 km W Kozani, 21–23.V.2000, 1 ♀, J. Junnilainen leg., L. Kaila prep. 5801 (MZH). **Italy:** Liguria, Noli (Savona), 21–30.IX.1951, 2 ♂, L. Kaila prep. 5381, 9–17.IV.1954, 2 ♂, L. Kaila prep. 5379, 5380, 22.IX.1960, 1 ♂, L. Kaila prep. 5378, 24.IX.1961, 1 ♂, 16.IX.1965, 1 ♂, all J. Klimesch leg. (ZSM); Susa, Mt. Rocclamelone, 1000 m, 1.VIII.1964, 2 ♂, J. Klimesch leg., L. Kaila prep. 5896 (ZSM). **Ukraine:** Crimea, Karadagh, 25.VII.1987, 5 ♂, 15.V.1988, 1 ♂, 13.VI.1988, 1 ♂, 9.VIII.1988, 3 ♂, 30.VII.1990, 1 ♂, 29.IV.1991, 1 ♂, 2.VI.1991, 1 ♂, 23.IV.1993, 1 ♂, L. Kaila prep. 3424, DNA sample Lepid. Phyl. 11339, 12.VIII.1993, 1 ♂, 14.VIII.1993, 1 ♂, L. Kaila prep. 3422, DNA sample 11337 Lepid. Phyl.; 8.V.1996, 2 ♂, 11.V.1996, 1 ♂, 19.VI.1996, 1 ♂, 28.VI.1996, 10 ♂, L. Kaila prep. 3425, 3426, DNA sample Lepid. Phyl. 11340, 11341, 11436, 11437, 11438, 24.VII.1996, 2 ♂, all Yu. Budashkin leg. (MZH). **Turkey:** Anatolia, Kizil- Kahamam, 1.VII.1966, 5 ♂, J. Klimesch leg., L. Kaila prep. 5871–4, 5889 (ZSM); 25 km S. Kayseri, Ergiydes Dagi, 2000–2300 m, 19–20.VI.1999, 1 ♂, J. Junnilainen leg. L. Kaila prep. 3912, DNA sample Lepid. Phyl. 11405 (Coll. Junnilainen).



FIGURES 73–74. Male genitalia of *Elachista parvula* Parenti. 73. Italy, Liguria [typel locality] (L. Kaila prep. 5381). 74. Ukraine, Crimea (L. Kaila prep. 3425).

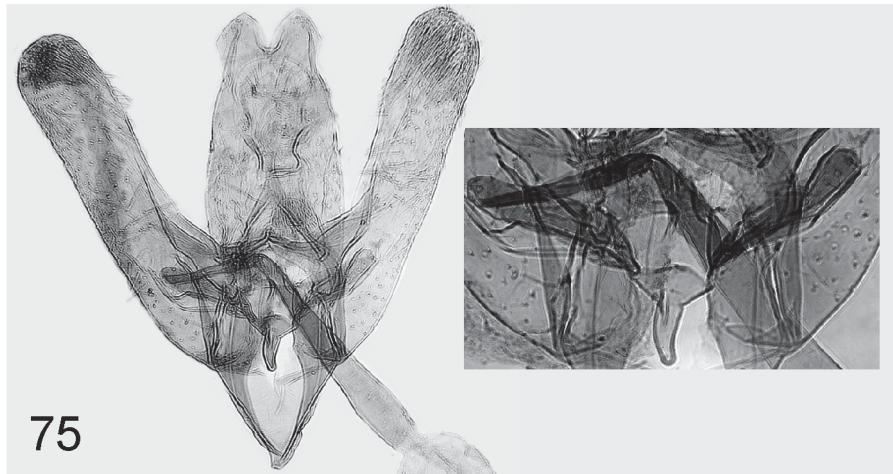
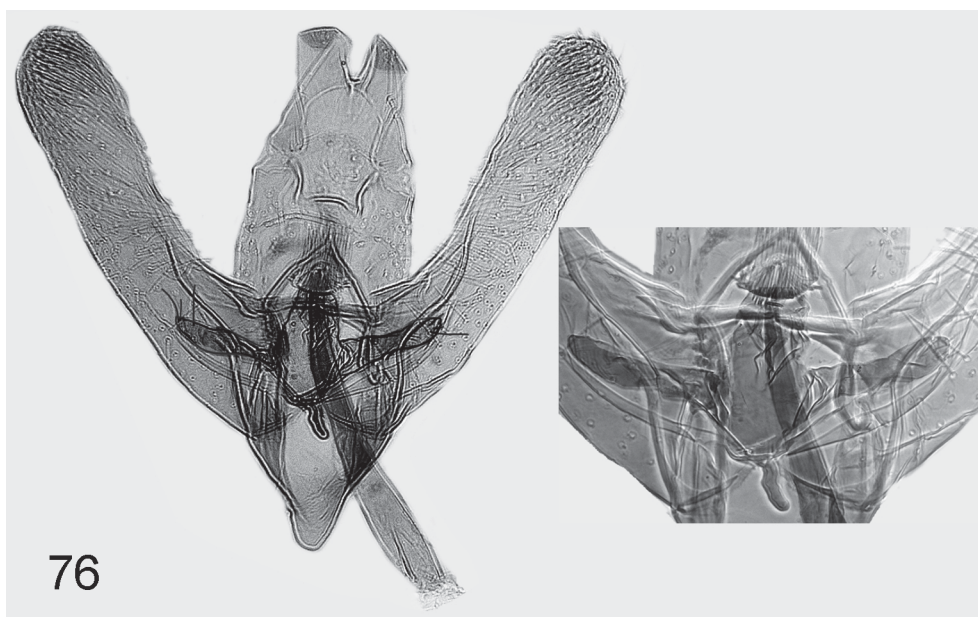


FIGURE 75. Male genitalia of *Elachista parvula* Parenti, *E. blancellae* Traugott-Olsen, holotype.



FIGURES 76–77. Male genitalia of *Elachista* spp. 76. *E. parvula* Parenti, holotype of *E. minusculella* Traugott-Olsen. 77. *E. moroccoensis* Traugott-Olsen, holotype.

Diagnosis. *E. parvula* is a small species, with wingspan 5.0–6.5 mm. The forewing maculation is usually concentrated as plical and discal spots more clearly than in other species of the *E. dispunctella* complex. The male genitalia are characterized by the very long digitate process, its length twice that of the juxta lobes. See also *E. moroccoensis* below. The female genitalia of *E. parvula* have a very narrow ductus bursae, and the antrum and appendix bursae are absent.

Biology. Unknown.

Distribution. France, Greece, Italy, Morocco, Ukraine, Turkey.

Remarks. The holotype of *E. parvula* Parenti was not available for the present study. The specimens studied, including two paratype slides from Italy, Liguria, collected by J. Klimesch, are from the type locality and belong to the same samples from which the entire type series was designated. These specimens agree in all aspects with the original description of *E. parvula*. *E. parvula* is referred to as OTU 18 in Mutanen *et al.* (2015). The distribution record of *E. parvula* from Russia, Kola Peninsula, by Parenti (2002), referring to Kozlov and Jalava (1994), is a lapsus as such a record does not exist in that publication.

The aquarelle representing the habitus of the holotype – the only specimen known – of *E. blancelli* by Traugott-Olsen (1992) has been painted to be unicolorous white. Since the specimen is extremely worn and nearly devoid of scales (cf. Fig. 19), this interpretation must be based on pure guesswork.

***Elachista moroccoensis* Traugott-Olsen, 1992**

Figs. 20, 77

Elachista moroccoensis Traugott-Olsen, 1992: 235.

Material studied. Type material. Holotype ♂ labelled: Type [rounded with red margin]; Genital praeparat n. E. 29.6.90 sex: ♂ *E. Traugott-Olsen*, Wing praeparat B. 5.7.90 sex: ♂ *E. Traugott-Olsen*; Morocco 1400–2000 m, Tinerhir area 12.IV.1989 Zool. Mus. Copenh. Exp.; *Elachista moroccoensis* sp. n. det. *E. Traugott-Olsen*; DNA sample MM16868 Lepid. Phyl. (ZMUC).

Diagnosis. *E. moroccoensis* (only male known) appears to be indistinguishable from *E. parvula* (see above).

Biology. Unknown.

Distribution. Morocco.

Remarks. The single known specimen is indistinguishable from *E. parvula*. Its status as distinct species, at least for time being, is nevertheless preferred due to the wide difference in its barcode as compared to the haplotypes of *E. parvula* samples from a wide area. Being already named, it is in accordance with nomenclatorial stability to maintain the current status instead of establishing an uncertain new synonymy on the basis of a single specimen. *E. parvula*, though widespread, is only known north of Mediterranean and eastward from there, while the single known specimen of *E. moroccoensis* is from North Africa.

***Elachista anitella* Traugott-Olsen, 1985**

Figs. 21, 78–79

Elachista anitella Traugott-Olsen, 1985a: 75.

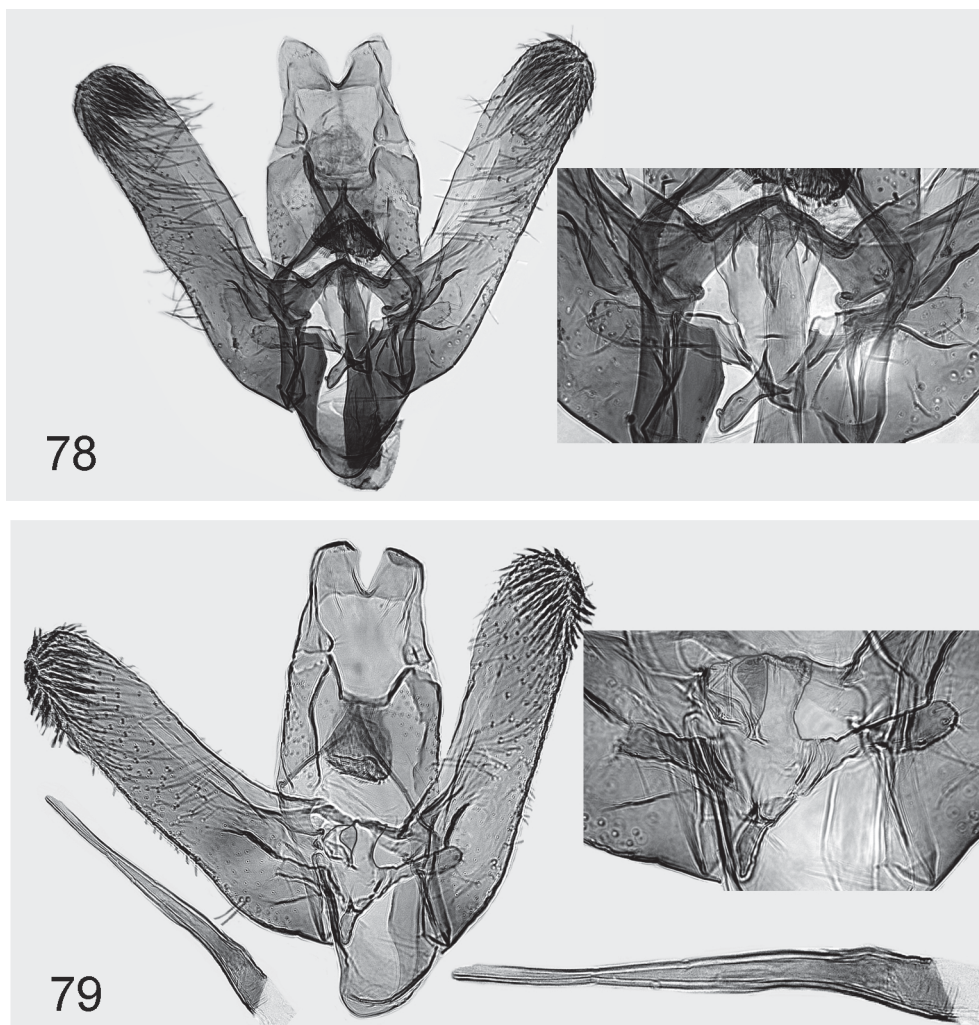
Material studied. Type material. Holotype ♂ labelled: Type [rounded with red margin]; Genital praeparat nr. 5800 sex: ♂ *E. Traugott-Olsen*; Hispania, Andalusia, Sierra Nevada, Cam, de Veleta 2300 m, 19.8.1984 *E. Traugott-Olsen* leg.; *Elachista anitella* n. sp. det. *E. Traugott-Olsen*; DNA sample MM15484 Lepid. Phyl. (ZMUC). **Other material. Spain:** Granada, Sierra Nevada, 20 km SE. Granada, 27.VII.2003, 1 ♂, T. Nupponen leg., L. Kaila prep. 5354, DNA sample 11423 Lepid. Phyl. (Coll. Nupponen); Granada, Sierra Nevada, 20 km SE Granada, 2700–2900 m, 11.VII.2010, 1 ♂, T. Nupponen leg., L. Kaila prep. 5355, DNA sample 15484 Lepid. Phyl. (Coll. Nupponen).

Diagnosis. *E. anitella* is a small species. It closely resembles *E. parvula*, from which the shorter digitate process of *E. anitella* readily separates it. Its phallus is shorter than the valva, narrow, and hardly tapered towards apex. Its uncus lobes are rounded, as long as their width.

Biology. Unknown.

Distribution. Spain.

Remarks. *E. anitella* is referred to as OTU 17 in Mutanen *et al.* (2015).



FIGURES 78–79. Male genitalia of *Elachista anitella* Traugott-Olsen. 78. Holotype. 79. Spain (L. Kaila prep. 5354).

***Elachista maboulella* Chrétien, 1915**

Figs. 22–24, 80–83, 128–134

Elachista maboulella Chrétien, 1915: 362.

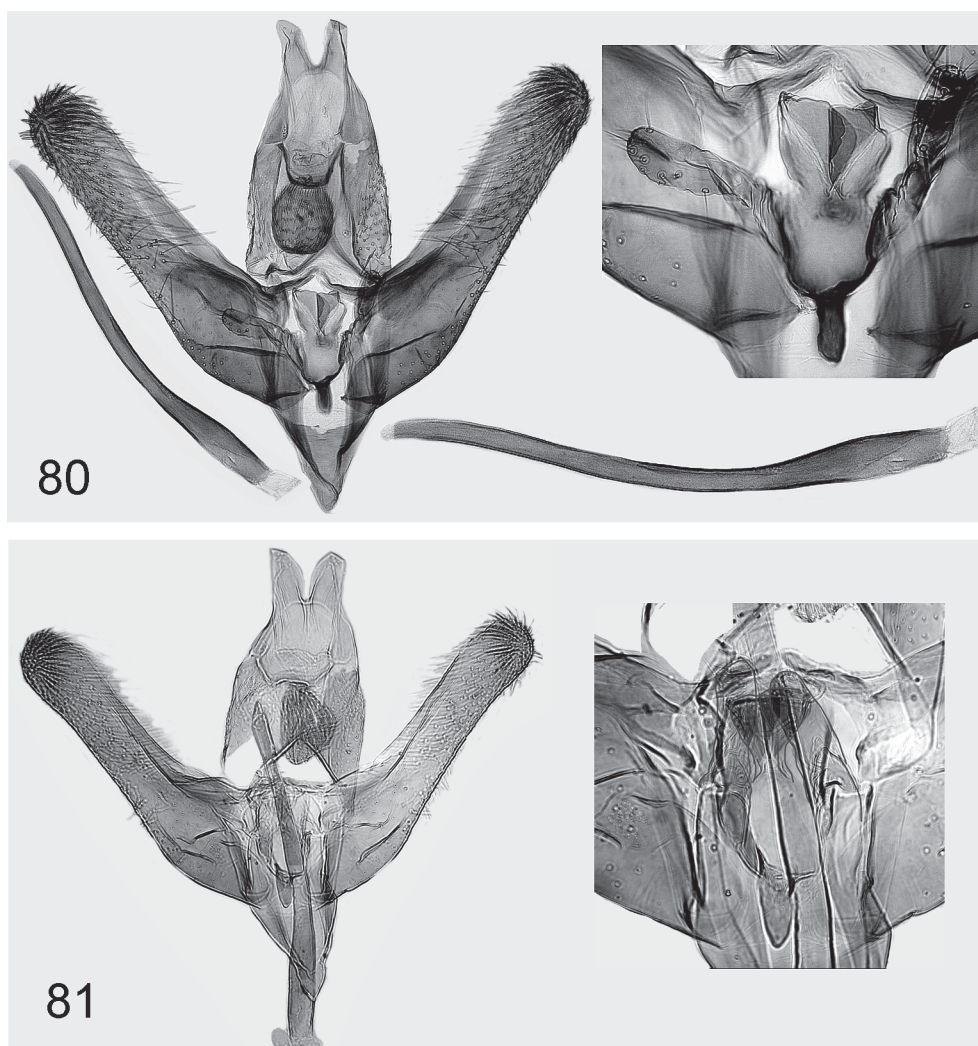
Elachista catalunella Traugott-Olsen, 1992: 210. **Syn. nov.**

Elachista gerdmaritella Traugott-Olsen, 1992: 243. **Syn. nov.**

Elachista gielisi Traugott-Olsen, 1992: 230. **Syn. nov.**

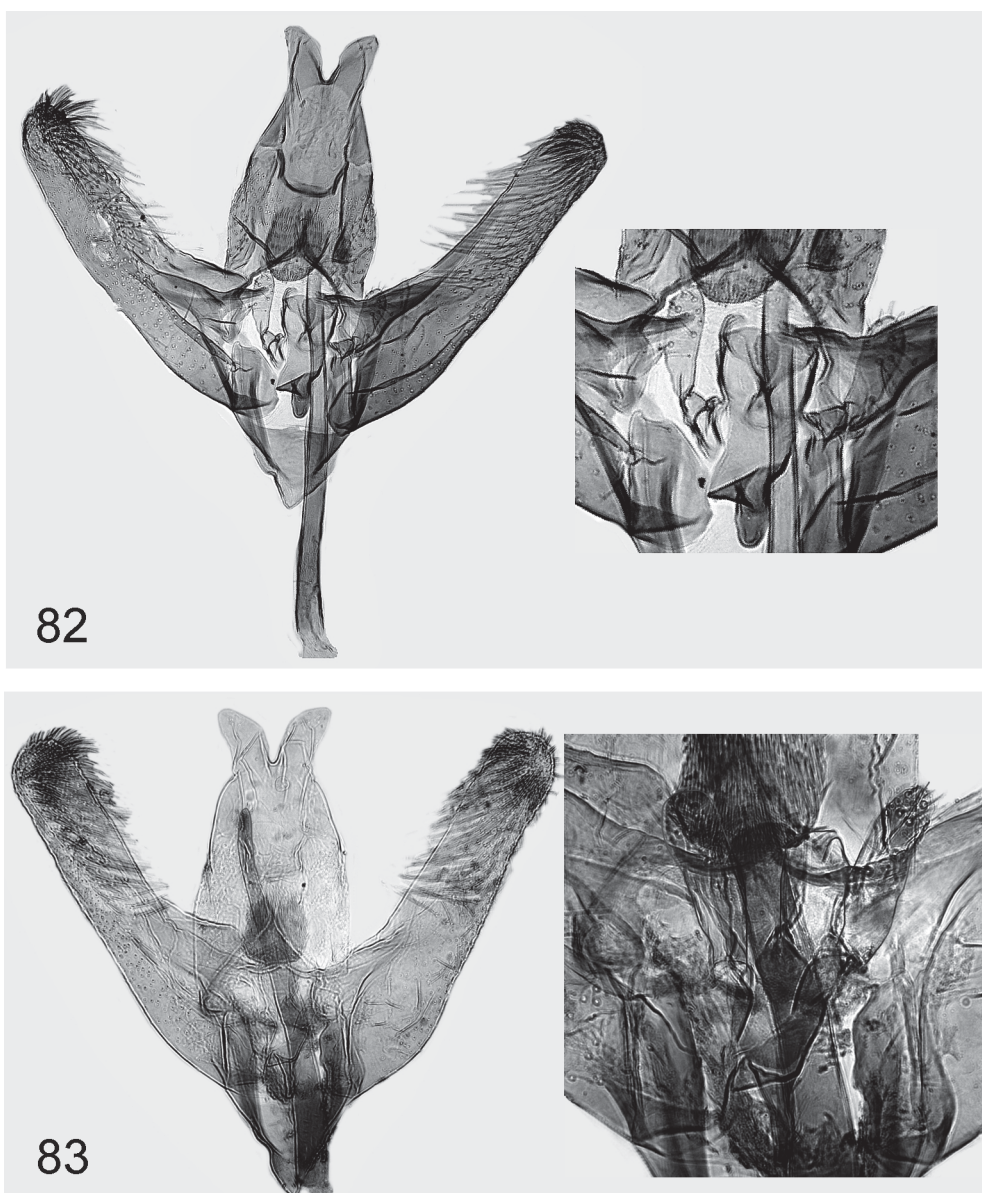
Material studied. Type material. Holotype ♂ of *E. catalunella*, labelled: Type [rounded with red margin]; Genital praeparat nr. 5643 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. 6257 sex: ♂ E. Traugott-Olsen; Hispania, Andalucia provincia Malaga, Camino de Ojn, 150 m, 21.6.1980 E. Traugott-Olsen; *Elachista catalunella* sp. n. det. E. Traugott-Olsen (ZMUC). Holotype ♂ of *E. gerdmaritella*, labelled: Type [rounded with red margin]; Genital praeparat nr. 5673 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. 6172 sex: ♂ E. Traugott-Olsen; Hispania, Andalucia, Provincia Malaga, Camino de Ojen, 150 m, 30.10.1982 E. Traugott-Olsen leg.; Holotype *Elachista gerdmaritella* Traugott-Olsen [red]; DNA sample MM16873 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. gielisi*, labelled: Type [rounded with red margin]; Genital praeparat nr. A. 25.3.88 sex: ♂ E. Traugott-Olsen; Wing

praeparat nr. C. 15.9.89 sex: ♂ E. Traugott-Olsen; Hisp[ania] Murcia, La Marta 19.4.1978 leg/det/coll Gielis, *Elachista gielisi* sp. n. det. E. Traugott-Olsen (RMNH).



FIGURES 80–81. Male genitalia of *Elachista maboulella* Chrétien. 80. Spain (L. Kaila prep. 3930). 81. *E. catalunella* Traugott-Olsen, holotype.

Other material. Spain: Alicante, 38°156.22'N, 00°54.86'W, Sierra de Crevillente, 5 km NE Albatera, 450 m, 2.IX.2005, 1 ♂, P. Huemer leg., DNA sample 16738 Lepid. Phyl. (TLMF), 2–3.IX.2005, 1 ♂, DNA sample 16798 Lepid. Phyl. (Coll. Wieser); Alicante, 11 km NNW Albatera, 500 m, 12.V.2009, 1 ♂, J. Tabell leg. & Coll., J. Tabell prep. 4403, DNA sample 05578 Lepid. Phyl.; 8.5 km NNW Albatera, 300 m, 22.V.2009, 5 ♂, J. Tabell leg. & Coll., J. Tabell prep. 4300, 4376, DNA samples 0555–6 Lepid. Phyl.; Alicante, San Miguel de Salinas, 3 km SW, 12.VI.2010, 1 ♂, J. Tabell leg. & Coll., J. Tabell prep. 4709, DNA sample 20174 Lepid. Phyl.; Alicante, route 8 km N of Albatera env., 300 m, 5.V.2008, 2 ♂, Z. Tokár leg. (Coll. Tokár); Almería, 1 km SW Tabernas, 370 m, 18.IX.2013, 11 ♂, 2 ♀, J. Tabell leg. & Coll.; Almería, 6 km SW Tabernas, Mini Hollywood, 400 m, 29–30.IV.1997, 1 ♀, H. W. v.d. Wolf leg. (MZH), 12.IV.1997, 1 ♀, H. W. v.d. Wolf leg., L. Kaila prep. 4701, DNA sample 20875 Lepid. Phyl. (MZH); Almería, Mini Hollywood, 230 m, 4–8.V.1994, 1 ♂ F. Schepler leg. (ZMUC); Almería, 6 km SW Tabernas, Mini Hollywood, 400 m, 30.IX.1993, 1 ♂, H. W. v.d. Wolf leg., L. Kaila prep. 1375; 6.V.1995, 1 ♂, H. W. v.d. Wolf leg., *Elachista totanaensis* E. Traugott-Olsen det. (MZH); Almería, 10 km E Bedar, 19–27.IX.2001, 1 ♂, P. Skou & B. Skule leg., L. Kaila prep. 4694 (ZMUC); Almería, 5 km SW Tabernas, 200 m, 28.V.1998, 1 ♂, P. Skou leg. (ZMUC); Almería, Tabernas, 37°02'N, 02°23'W, 20–26.VI.2008, 1 ♂, 6–8.VII.2007, 1 ♂, G. Jeppesen leg. (ZMUC); 380 m, Tabernas, env. Aghuilla Salada, 550 m, 7.VII.2010, 1 ♂, Z. Tokár leg., DNA sample 20519 Lepid. Phyl. (Coll. Tokár); Almería, 10 km NW Almería, 20–21.IV.2001, 2 ♂, J. Junnilainen leg., L. Kaila prep. 4090, DNA samples 11364, 11372 (Coll. Junnilainen); Almería, El Pozo del Esparto, 10 m, 13.V.2006,



FIGURES 82–83. Male genitalia of *Elachista mabourella* Chrétien. 82. holotype of *E. gerdmaritella* Traugott-Olsen. 83. *E. gielisi* Traugott-Olsen, holotype.

2 ♂, P. Skou leg. (ZMUC); Granada, Baza, 110 km NE Granada, 30.V.1976, 1 ♂, Glaser leg. (SMNK); Granada, 15 km NE Baza, 13.IX.2013, 2 ♂, 1 ♀, T. Nupponen leg. (Coll. Nupponen); Granada, Carataunas, 26.V.1999, 1 ♀, J. Junnilainen leg., DNA sample 11374 Lepid. Phyl. (Coll. Junnilainen); Granada, 10 km N Motril, 5 ♂, 1 ♀, J. Junnilainen leg., L. Kaila prep. 3950, 3952, 4093, 5728, J. Tabell prep. 4471, 4481, DNA samples 11360–2, 11366–9 (Coll. Junnilainen, MZH); Granada, Orgiva, Las Alpujarras, 29.VI.1971, 1 ♂, Glaser leg. (SMNK); Granada, Sierra Alfacar, 1300 m, 24.VI.1971, 1 ♂, Glaser leg. (SMNK); Malaga, 20 km NE Ronda, 31.V.2000, 1 ♂, T. Nupponen leg., 9.IV.2002, 2 ♂, T. & K. Nupponen leg., L. Kaila prep. 4047, DNA samples 11365, 11426 Lepid. Phyl. (Coll. Nupponen); Malaga, 8 km NW Marbella, 2.VI.2000, 1 ♀, T. Nupponen leg., DNA sample 11373 Lepid. Phyl. (Coll. Nupponen); 10 km N Marbella, 24–25.IV.2001, 2 ♀, J. Junnilainen leg., DNA samples 11370–1 Lepid. Phyl. (Coll. Junnilainen, MZH); Malaga, Strasse Tarifa-Algeciros, 14 km W Algec., 200 m, IX.1972, 1 ♂, M. u. W. Glaser leg. (SMNK); Murcia, 4 km SW Aguilas, 20–22.IX.1995, 1 ♂, H. W. v.d. Wolf leg., *Elachista gerdmaritella* E. Traugott-Olsen det., DNA sample 11378 Lepid. Phyl. (MZH); 14–15.IV.1997, 1 ♂, H. W. v.d. Wolf leg., L. Kaila prep. 3925, DNA sample 11357 (MZH); 5–6.IX.1997, 1 ♂, H. W. v.d. Wolf leg., L. Kaila prep. 3926, DNA sample 11358 Lepid. Phyl. (MZH); Murcia, Sierra d’Espuña, Alhama de Murcia, 1–25.VI.1971, 4 ♂, 1 ♀, M. u. W. Glaser leg. (SMNK); Murcia, Sierra d’Espuña C.F. de las Alqueiras, 800 m, 4.IV.1997, 2 ♂, H.

W. v.d. Wolf leg., L. Kaila prep. 3929, 3930, DNA samples 11353–4, 3.IX.1997, 2 ♂, H. W. v.d. Wolf leg., L. Kaila prep. 3927, 3928, DNA samples 11356, 11359 Lepid. Phyl. (MZH), 1400 m, 3.IX.2000, 1 ♂, H. W. v.d. Wolf leg., L. Kaila prep. 3922, DNA sample 11355 (MZH); Prov. Murcia, Bolnuevo by Mazarron, 10 m, 25.V.1998, 1 ♂, P. Skou leg. (ZMUC); Murcia, 7 km NW Sucina, Sierra de Altaona, 350 m, 2.V.2009, 1 ♂, J. Tabell leg. J. Tabell prep. 4404, DNA sample 05579 Lepid. Phyl. (Coll. Tabell); Prov. Tarragona, 5 km S. St. Carles de la Ràpita, 14.VI.1999, 1 ♂, P. Skou leg., L. Kaila prep. 4695 (ZMUC). **Tunisia:** 10 km NW Kasserine, Djebel Chambi N., 18.XI.2009, 3 ♂, T. Nupponen leg., L. Kaila prep. 5263, 5264, DNA samples 15318–20 Lepid. Phyl., (Coll. Nupponen, MZH).

Diagnosis. *E. maboulella* has distally grey forewing fringe scales, unless worn. Similar fringe is present only in *E. disemiella*. The male genitalia of these species are similar, differing by the setae on the juxta lobes: *E. disemiella* has several distinct setae, whereas *E. maboulella* has none, or at most, a few very small ones. The female genitalia of these species differ by the shape of the corpus bursae which is oval in *E. disemiella*; divided into two portions, the anterior one possibly a dilated appendix bursae, in *E. maboulella*.

Biology. Bivoltine. The species inhabits dry, xerothermic habitats.

Distribution. Algeria, Tunisia, Spain.

Remarks. The type locality of *E. maboulella* is Algeria, Biskra, Gafsa. The female lectotype is in Musée Nationale d'Histoire Naturelle, Paris, designated and illustrated by Parenti (1972). The characterization of *E. maboulella* by Traugott-Olsen is based on male paralectotypes and represents *E. glaseri*.

The illustration of the male genitalia of *E. bazaella* by Traugott-Olsen (1992) is not drawn from the holotype, and is not conspecific with it. The holotype is identical with *E. maboulella*. *E. maboulella* is referred to as OTU 13 in Mutanen *et al.* (2015).

Elachista disemiella Zeller, 1847

Figs. 31, 84–85, 135

Elachista disemiella Zeller, 1847: 893.

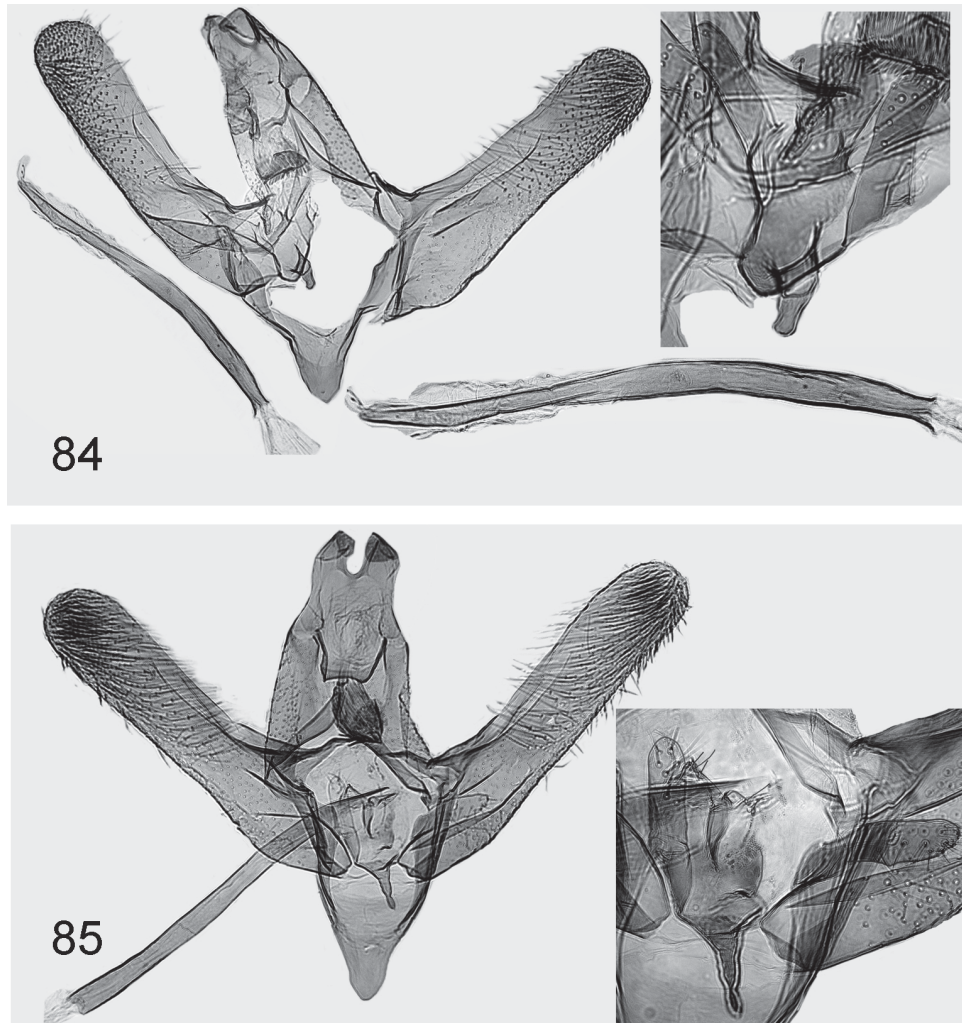
Material studied. Type material. Lectotype ♂ labelled: LECTOTYPE [rounded with blue margin]; 53 [rounded pale blue label]; *Disemiella* Z; Messin 9 Marz; B. M. ♂ Genitalia slide No. 19362; LectoTYPUS *Elachista disemiella* Z. teste U. Parenti 1973 (BMNH). **Other material. Spain:** Castellet-Villafranca del Panadés (Barcelona), 200 m a.s.l., 1974, 2 ♂, 1 ♀, e.l. ex *Amphelodesmos mauritanicus* U. Parenti leg.; E. Traugott-Olsen prep. A 1.12.85, (ZMUC), 28.V.1974, 1 ♀, J. Tabell prep. 4441; 4.VI.1974, 1 ♂, J. Tabell prep. 4393 (Coll. Tabell); Barcelona, Sitges 10 km NW, Viladellops, 165 m, 30.V.2009, 1 ♂, J. Tabell leg. & Coll., J. Tabell prep. 4372, DNA sample 05570 Lepid. Phyl.; larvae 12.III.2010, e.l. ex *Amphelodesmos mauritanicus*, 4 ♂, 4 ♀, emg. 8–13.IV.2010, J. Tabell prep. 4600, 4658, DNA sample 05596 Lepid. Phyl. (Coll. Tabell); Sitges 8 km NW, 100 m, *Amphelodesmos mauritanicus* 19.3.2010, e.l. 7.IV–5.V.2010, 6 ♂, 10 ♀, J. Tabell prep. 4677; Sitges 6 km NW, 90 m, *Amphelodesmos mauritanicus*, 12.III.2010, e.l. 6–10.IV.2010, 5 ♂, 1 ♀ (Coll. Tabell); 10 km NW Sitges, 100 m a.s.l., e. l. ex *Amphelodesmos mauritanicus*, 2 ♂, 2 ♀, emg. 12–19.III.2010, DNA sample Lepid. Phyl. 15301, 15302, 15303, 15304, J. Tabell leg. (MZH); Mallorca, 9 km NE Sóller, Serra de Torrella, Col de Cals Reis, 710 m, 29.IX.2013, 1 ♂, 2.X.2013, 1 ♂, T. Nupponen leg., L. Kaila prep. 5821 (Coll. Nupponen). **Tunisia:** Ain Draham area, 5–18.V.1988, 1 ♂, 1 ♀, Zool. Mus. Copenhagen Exp., E. Traugott-Olsen prep. D 17.8.89 (ZMUC); Atlas Mts., 15 km NE Makthar Village, conifer forest, 1000 a.s.l., 3.V.2000, 1 ♂, DNA sample Lepid. Phyl. 11407, K. Nupponen leg., Coll. Nupponen; Atlas Mts., 40 km SE Le Kef, near El Ksour village, dry meadow close to chalk mine, 800 m a.s.l., 2.V.2000, 1 ♀, DNA sample Lepid. Phyl. 11406, K. Nupponen leg. (Coll. Nupponen).

Diagnosis. *E. disemiella* has distally grey forewing termen fringe scales. As such, it resembles *E. maboulella*. The differentiation of these species is explained in the diagnosis of *E. maboulella*.

Biology. The larvae of *E. disemiella* mine the leaves of *Amphelodesmos mauritanicus* (Poiret) T. Durand & Schinz (Poaceae) (Parenti & Varalda 1994; J. Tabell, personal communication).

Distribution. Italy (Sardinia) and Spain, including Mallorca and Tunisia.

Remarks. *E. disemiella* is referred to as OTU 14 in Mutanen *et al.* (2015).



FIGURES 84–85. Male genitalia of *Elachista disemiella* Zeller. 84. lectotype. 85. Spain (L. Kaila prep. 5704).

***Elachista tribertiella* Traugott-Olsen, 1985**

Figs. 25–30, 86–93, 136

Elachista tribertiella Traugott-Olsen, 1985: 74.

Elachista toveella Traugott-Olsen, 1985: 73. **Syn. nov.**

Elachista baldizzonella Traugott-Olsen, 1985: 74. **Syn. nov.**

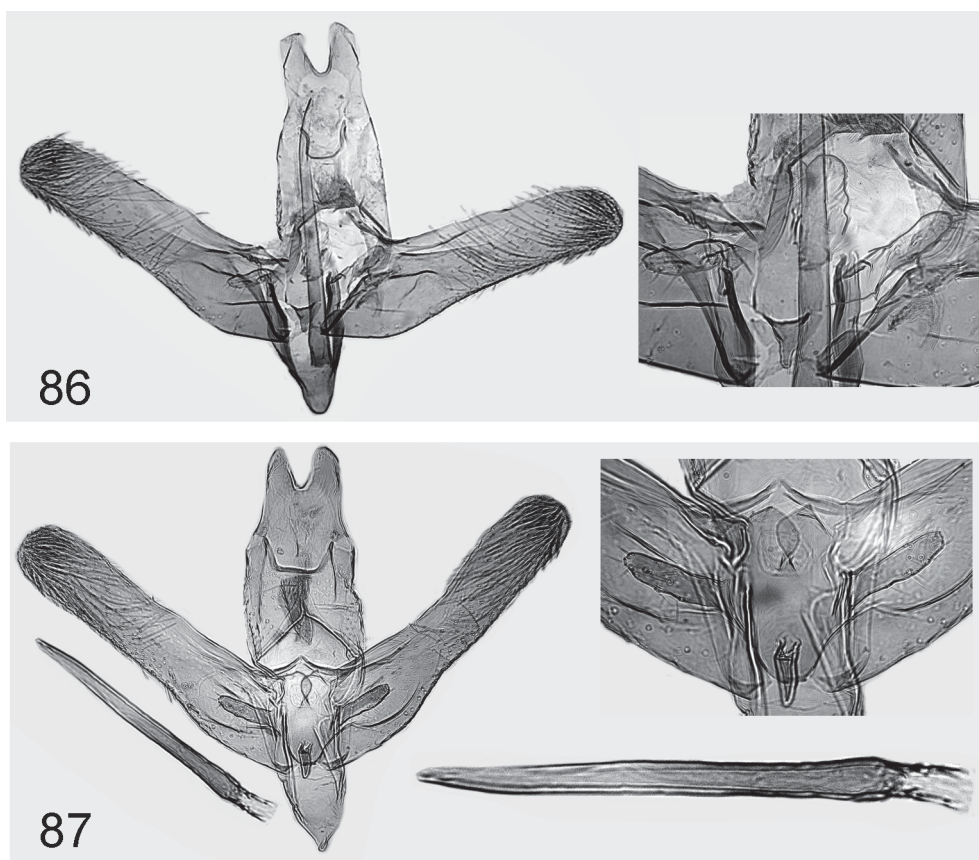
Elachista veletaella Traugott-Olsen, 1992: 222. **Syn. nov.**

Elachista bazaella Traugott-Olsen, 1992: 221. **Syn. nov.**

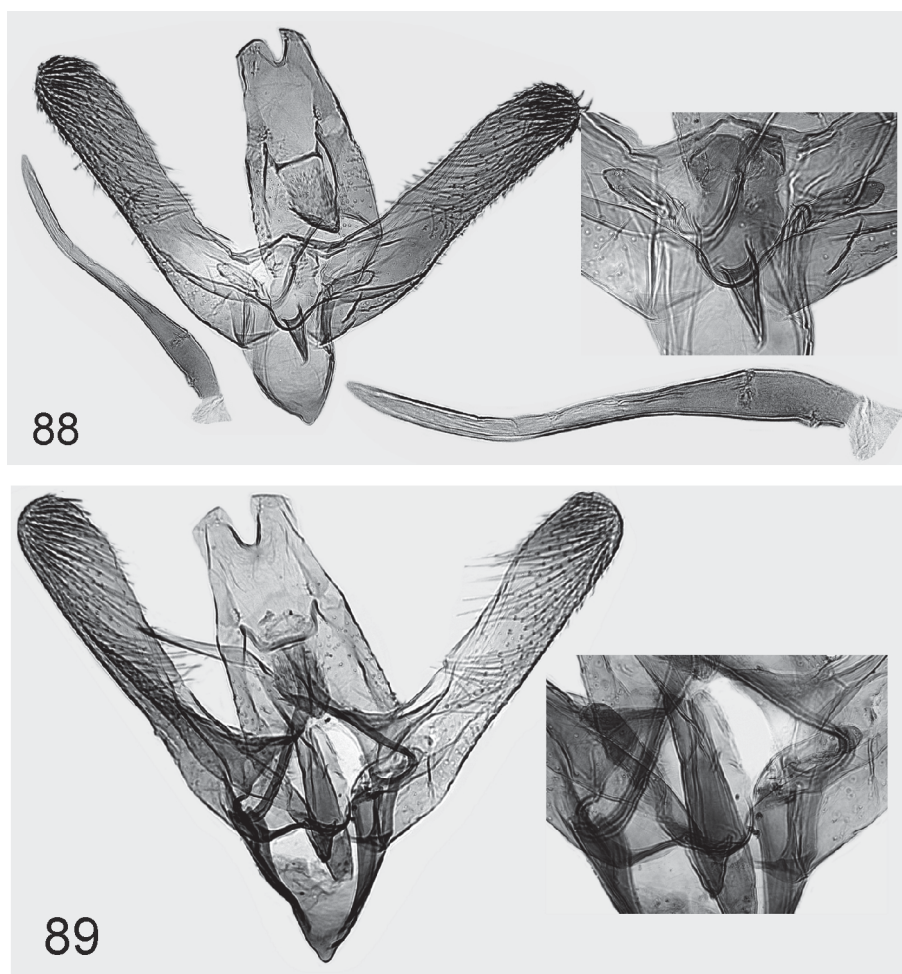
Elachista louiseae Traugott-Olsen, 1992: 238. **Syn. nov.**

Material studied. Type material. Holotype ♂ of *E. tribertiella* labelled: Type [rounded with red margin]; Genital praeparat nr. 5810 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. 6266 sex: ♂ E. Traugott-Olsen; Hispania, Andalucia, Sierra Nevada, Cam. d. Veleta, 2000 m, 24.7.1983 E. Traugott-Olsen leg.; *Elachista tribertiella* n. sp. E. Traugott-Olsen det; DNA sample MM16872 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. toveella* labelled: Type [rounded with red margin]; Genital praeparat nr. 5798 sex: ♂ E. Traugott-Olsen; Hispania, Andalucia, Sierra Nevada, Cam. d. Veleta 1750 m, 24.7.1983 E. Traugott-Olsen leg.; *Elachista toveella* sp. n. det. E. Traugott-Olsen; DNA sample MM16848 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. baldizzonella* labelled: Type [rounded with red margin]; Genital praeparat nr. 5817 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. 6265 sex: ♂ E. Traugott-Olsen; Hispania, Andalucia, Sierra Nevada, Cam. de Veleta, 2000 m, 24.7.1983 E. Traugott-Olsen leg.; *Elachista baldizzonella* sp. n. det. E. Traugott-Olsen; DNA sample MM16869 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. veletaella* labelled: Type [rounded with red margin]; Hispania, Andalucia, Sierra Nevada, Cam. d. Veleta, 2000 m,

24.7.1983 E. Traugott-Olsen; Wing praeparat nr. 6241 sex: ♂ E. Traugott-Olsen; *Elachista veletaella* sp. n. det. E. Traugott-Olsen; L. Kaila prep. 5292; DNA sample MM16843 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. bazaella* labelled: Type [rounded with red margin]; genital praeparat nr. 5876 sex: ♂ E. Traugott-Olsen; wing praeparat nr. C. 1.11.91 sex: ♂ E. Traugott-Olsen; Hispania, Andalucia, Sierra Nevada, Cam. de Veleta, 2000 m, 25.7.1983 leg. G. Baldizzone & P. Triberti; *Elachista bazaella* sp. n. det. E. Traugott-Olsen; DNA sample MM16842 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. louiseae* labelled: Type [rounded with red margin]; genital praeparat nr. 5868 sex: ♂ E. Traugott-Olsen; Wing praeparat nr. 6238 sex: ♂ E. Traugott-Olsen; Hispania, Andalusia, Sierra Nevada, 1900–2000 m, Strada Veleta 25.VII.1983 leg. G. Baldizzone & P. Triberti; *Elachista louiseae* sp. n. det. Traugott-Olsen; DNA sample MM16870 Lepid. Phyl. (ZMUC). **Other material. Spain:** Alicante, Sierra de Crevillente, 5 km NE Albatera, 450 m, 38°15.82'N, 00°54.86'W, 2.IX.2005, 2 ♂, 1 ♀, P. Huemer leg., L. Kaila prep. 5576, 5577, 5578, DNA samples 16739–41 Lepid. Phyl. (TLMF); Alicante, 3 km SW San Miguel de Salinas, 13.IV.2009, 1 ♂, J. Tabell leg., J. Tabell prep. 4408, DNA sample 05567 Lepid. Phyl.; 16.IV.2009, 1 ♂, J. Tabell prep. 4595, DNA sample 05588 Lepid. Phyl.; 23.IV.2009, 1 ♂, J. Tabell prep. 4397, DNA sample 05580 Lepid. Phyl., (Coll. Tabell); Almeria, 20 km N Almeria, 13.IV.2013, 1 ♂, T. Nupponen leg., L. Kaila prep. 5924 (Coll. Nupponen); Almeria, Sierra Nevada, 1100 m, 6 km Puerto de la Ragua, 22.VIII.1998, 1 ♂, T. Nupponen leg., L. Kaila prep. 4145 (Coll. Nupponen); 37°19'72"N, 3°21'18"W, Granada, 2 km W Diezma, 1400 m, 9–10.VII.2010, 1 ♂, Z. Tokár leg., DNA sample 20510 Lepid. Phyl. (Coll. Tokár); Granada, Sierra Nevada, 2500 m, 20 km SE Granada, 12.VII.2010, 1 ♂, T. Nupponen leg., L. Kaila prep. 5356, DNA sample 15477 Lepid. Phyl. (Coll. Nupponen); Andalucia, Sierra Nevada, Cam. d. Veleta, 2500 m, 18.VII.1965, 1 ♂, L. Kaila prep. 4053, 2300 m, 19.VIII.1984 1 ♂, 1.VII.1986, 2 ♂, E. Traugott-Olsen leg., L. Kaila prep. 4693, 5563, 5565 (ZMUC); Málaga, Sierra de Tejeda, 3 km NWN Sedella, 630 m, 16.IX.2013, 1 ♂, J. Tabell leg., J. Tabell prep. 5126 (Coll. Tabell); Murcia, 4 km SW Aguila, 24.IV.1995, 1 ♂, H.W. v.d. Wolf leg., E. Traugott-Olsen prep. B. 2.VIII.1996, *E. bazaella* E. Traugott-Olsen det. (MZH).



FIGURES 86–87. Male genitalia of *Elachista tribertiella* Traugott-Olsen. 86. Holotype. 87. Spain (L. Kaila prep. 5577).



FIGURES 88–89. Male genitalia of *Elachista tribertiella* Traugott-Olsen. 88. Spain (L. Kaila prep. 5578). 89. *E. toveella* Traugott-Olsen, holotype.

Diagnosis. The male genitalia of *E. tribertiella* are similar to those of *E. glaseri*. The length of the phallus is 6/7 of the length of valva in *E. tribertiella*, less in *E. glaseri*, in which the phallus is a little broader at the base than in *E. tribertiella*. The valva is straight in *E. tribertiella*, somewhat s-shaped in *E. glaseri*. As these differences are subtle, show some variation, and may be distorted during dissection, it is possible that the males of these species may not always be distinguishable from each other. The female of the species differs more from each other: in *E. glaseri* the width of the ostium bursae is 1/3 of the distance between apophyses anteriores, the ductus bursae is broad and is incepted on the corpus bursae without distinct border, and its appendix bursae is about three times as long as wide. In *E. tribertiella* the width of the ostium bursae is half the distance between the apophyses anteriores, the ductus bursae is very narrow and incepted on the corpus bursae with distinct border and the appendix bursae is over four times as long as wide.

E. tribertiella varies from white to slightly suffused, usually with scattered dark-brown scales which, however, are easily lost. Its size is also variable from small to medium-sized within the *E. dispunctella* group, with wingspan ranging from 8–10 mm.

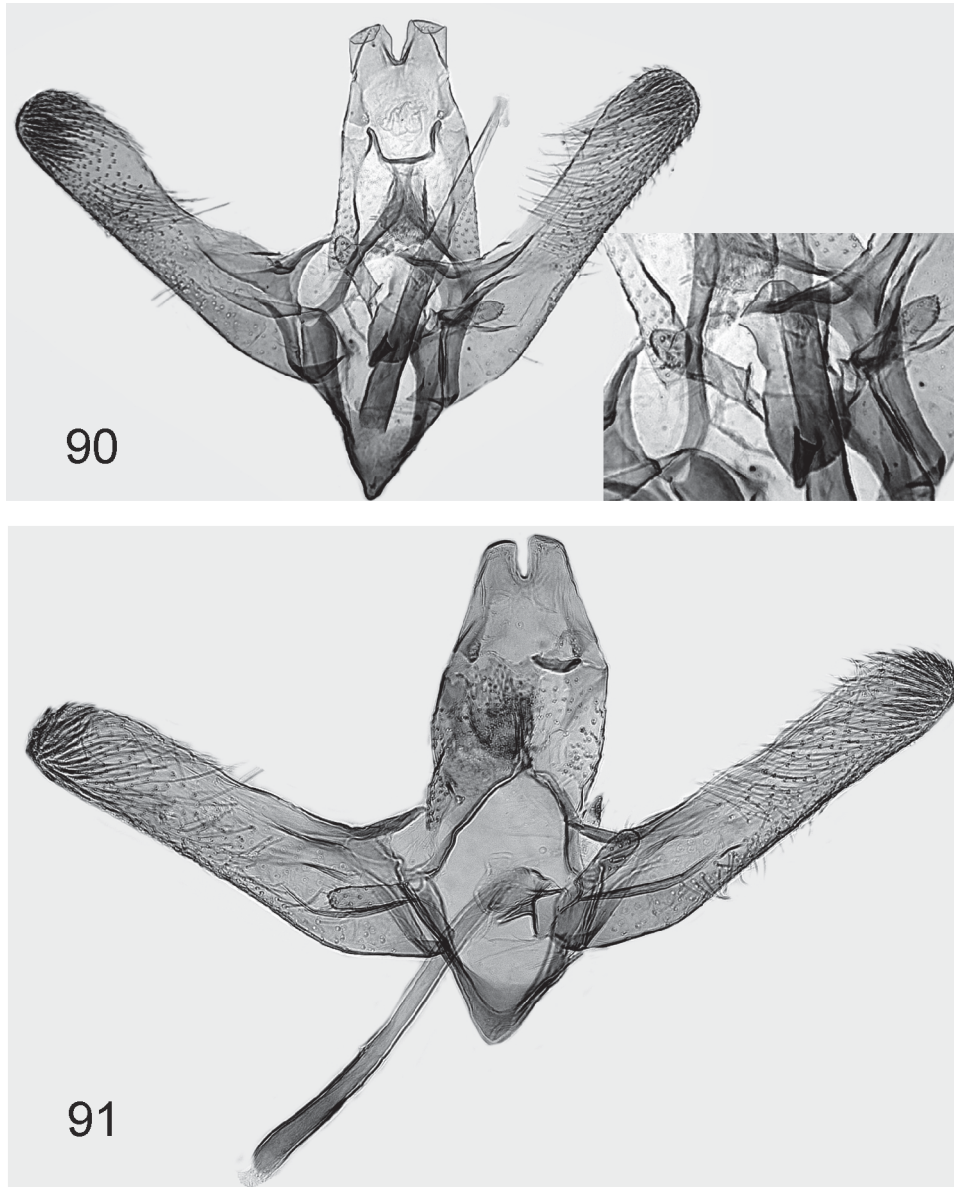
Remarks. *E. tribertiella* is referred to as the similar OTUs 9 and 10 with their barcode difference of 1.4% in Mutanen *et al.* (2015).

***Elachista glaseri* Traugott-Olsen, 1992**

Figs. 32–39, 94–102, 137–138

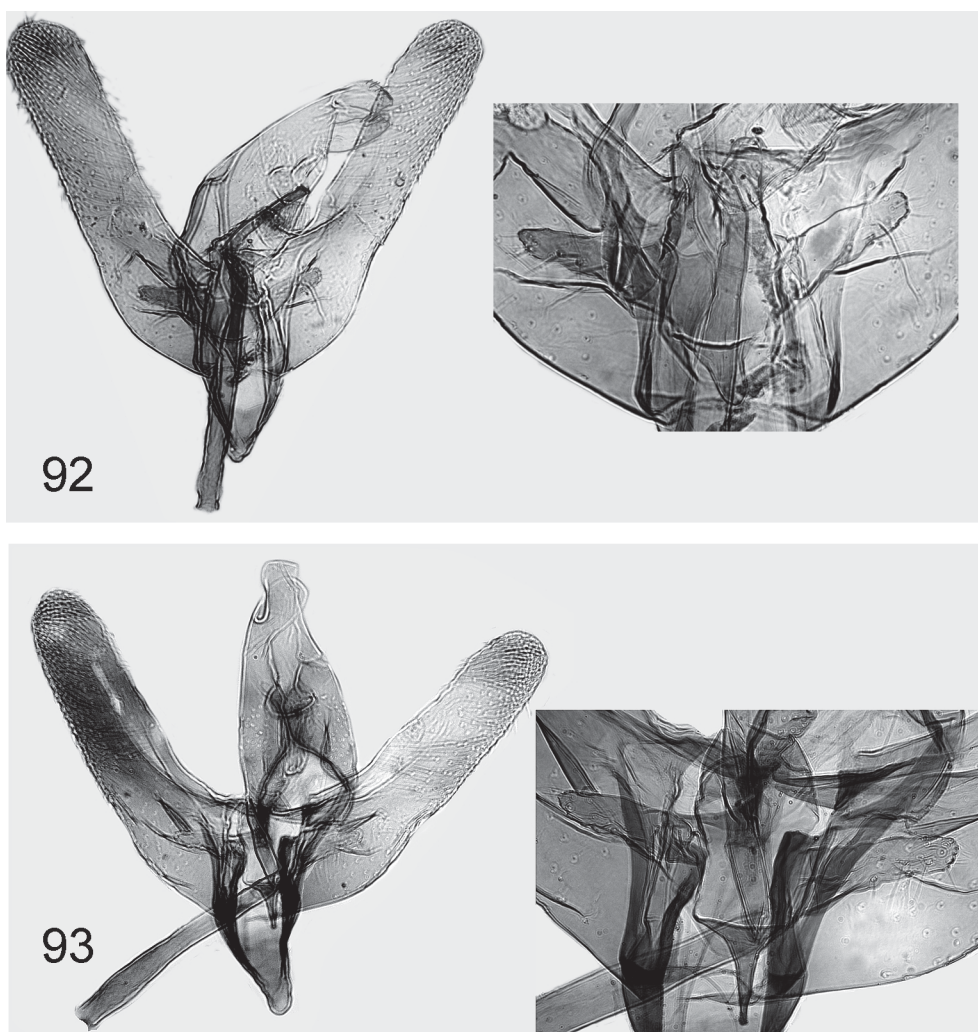
Elachista glaseri Traugott-Olsen, 1992: 234.

Elachista rikkeae Traugott-Olsen, 1992: 238. **Syn. nov.**
Elachista totanaensis Traugott-Olsen, 1992: 248. **Syn. nov.**
Elachista olemartini Traugott-Olsen, 1992: 251. **Syn. nov.**
Elachista bengtssoni Traugott-Olsen, 1992: 246. **Syn. nov.**
Elachista senecai Traugott-Olsen, 1992: 228. **Syn. nov.**
Elachista wadielhiraensis Traugott-Olsen, 1992: 245. **Syn. nov.**
Elachista rissaniensis Traugott-Olsen, 1992: 247. **Syn. nov.**
Elachista michelseni Traugott-Olsen, 1992: 245. **Syn. nov.**



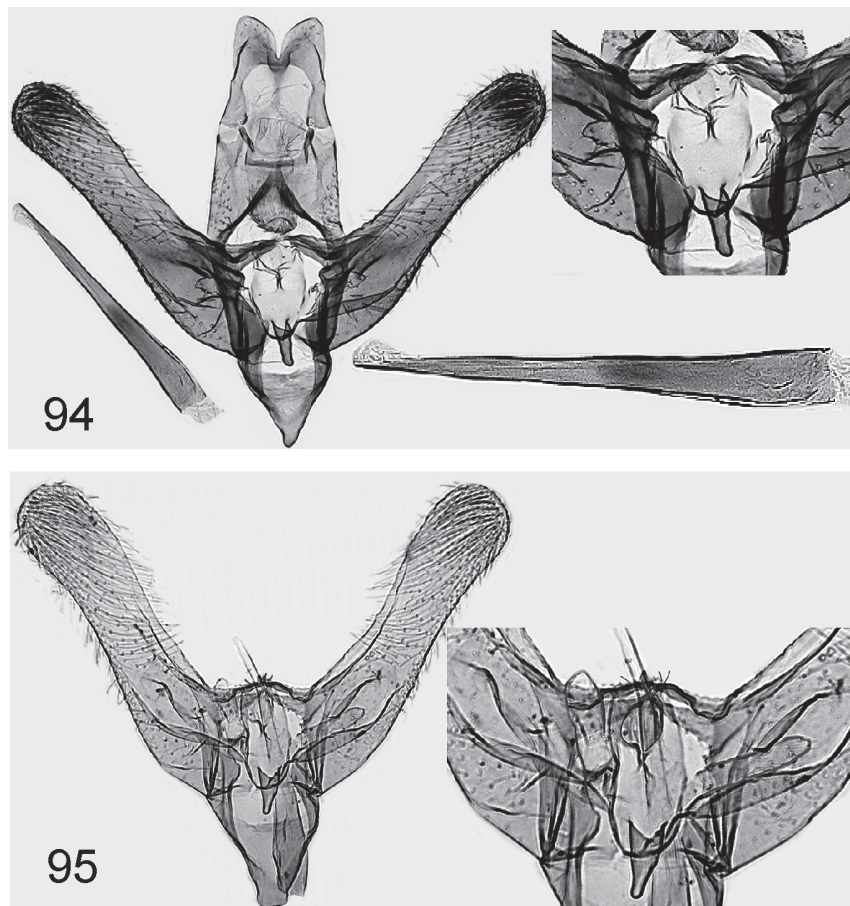
FIGURES 90–91. Male genitalia of *Elachista tribertiella* Traugott-Olsen.. 90. *E. baldizzonella* Traugott-Olsen, holotype. 91. *E. veletaella* Traugott-Olsen, holotype.

Material studied. Type material. Holotype ♂ of *E. glaseri*, labelled: Type [rounded with red margin]; Genital praeparat nr. 5890 sex: ♂ *E. Traugott-Olsen*; Wing praeparat nr. 6184 sex: ♂ *E. Traugott-Olsen*; Hispania, Prov. Murcia, Alhama de Murcia 1.–2.6.1973 leg. M. u. W. Glaser; *Elachista glaseri* sp. n. det. *E. Traugott-Olsen*; DNA sample MM16867 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. rikkeae*, labelled: Type [rounded with red margin]; Genital praeparat nr. 6022 sex: ♂ *E. Traugott-Olsen*, Wing praeparat 6023 sex: ♂ *E. Traugott-Olsen*; Hisp[ania], Prov. Granada, Cam. Baza-Benamaurel, 15 km de Baza 17.7.1987 leg. G. Baldizzzone y *E. Traugott-Olsen*; *Elachista rikkeae* sp. n. det. *E. Traugott-Olsen*; DNA sample MM16871 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. olemartini*, labelled: Type [rounded with red margin]; Genital praeparat nr. G.20.1.88 ex: ♂ *E. Traugott-Olsen*



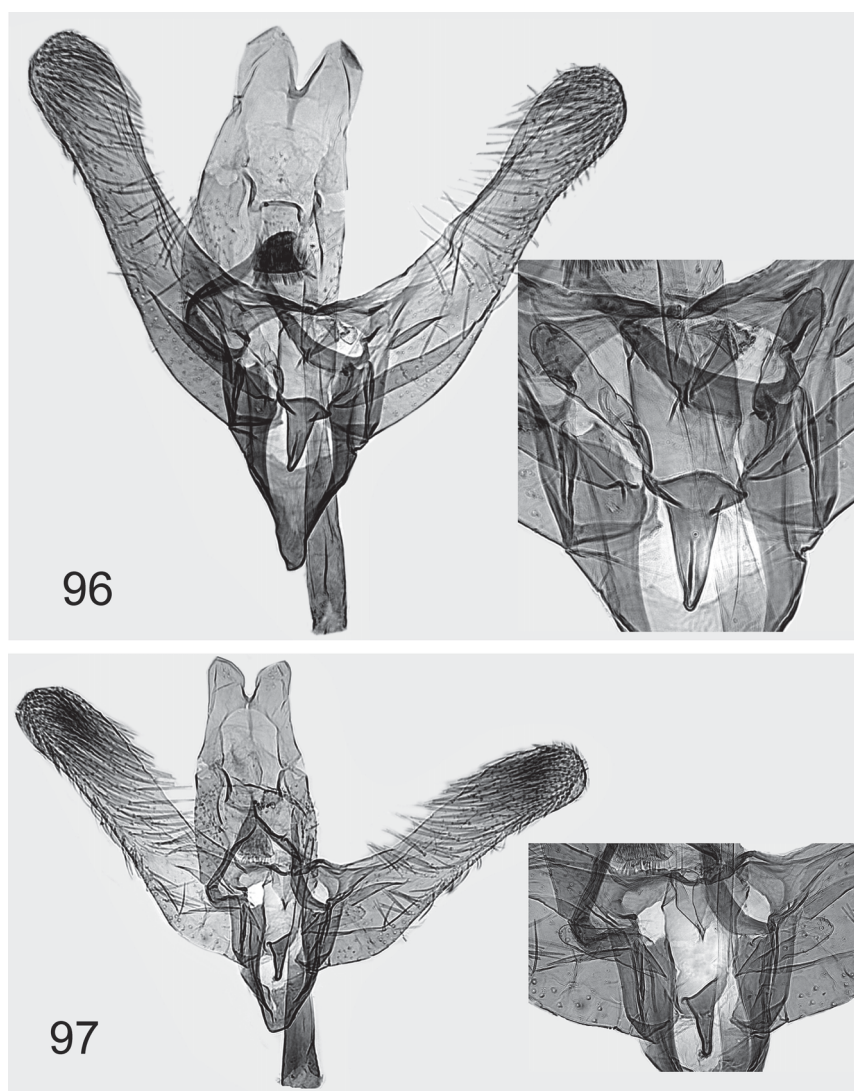
FIGURES 92–93. Male genitalia of *Elachista tribertiella* Traugott-Olsen. 92. *E. bazaella* Traugott-Olsen, holotype. 93. *E. louiseae* Traugott-Olsen, holotype.

ZMUC; Wing genital praeparat nr. B.15.1.90 sex: ♂ *E. Traugott-Olsen*; Tunisia, Nefta 14.–16.III.1986 Zool. Mus. Copenhagen Exp.; *Elachista olemartini* sp. n. det. *E. Traugott-Olsen*; DNA sample 16854 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. bengtssoni*, labelled: Type [rounded with red margin]; Genital praeparat nr. 6275 sex: ♂ *E. Traugott-Olsen*; Spain, Alicante, Torrevieja, Lago Jardin, 28.VI.1989 B. . Bengtsson leg.; Akvarel *E. Traugott-Olsen*; *Elachista bengtssoni* sp. n. det. *E. Traugott-Olsen*; DNA sample 16851 Lepid. Phyl. (ZMUC); paratypes of *E. bengtssoni*: Spain, Alicante, Torrevieja, Lago Jardin, 28.VI.1989 2 ♂ B. . Bengtsson leg., Parenti prep. 12273 and Bengtsson prep 3912 “Not. *bengtssoni* [handwritten]; Bengtsson prep. 3357 (Coll. Bengtsson). Holotype ♂ of *E. senecai*, labelled: Type [rounded with red margin]; Genital praeparat nr. F. 15.1.90 sex: ♂ *E. Traugott-Olsen*, Wing praeparat A, 22.1.90 sex: ♂ *E. Traugott-Olsen*; Libya, Gharian, Wadi El Hira 13.5.1983 Uffe Seneca leg.; *Elachista senecai* sp. n. det. *E. Traugott-Olsen*; DNA sample 16847 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. wadielhiraensis*, labelled: Type [rounded with red margin]; Genital praeparat nr. A.6.3.87 sex: ♂ *E. Traugott-Olsen*; Wing praeparat nr. E.19 1.90 sex: ♂ *E. Traugott-Olsen*; Libya Wadi El Hira 13.V.1983 Uffe Seneca leg.; Zool. Mus. København; Akvarel *E. Traugott-Olsen*; *Elachista wadielhiraensis* sp. n.; DNA sample 16849 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. rissaniensis*, labelled: Type [rounded with red margin]; Genital praeparat nr. C. 29.6.90 sex: ♂ *E. Traugott-Olsen*; Wing praeparat nr. C. 10.3.91 sex: ♂ *E. Traugott-Olsen*; Morocco, 900 m, Erfoud/Rissani area 13.–14.IV.1986 Zool. Mus. Copenh. leg.; Akvarel *E. Traugott-Olsen*; *Elachista rissaniensis* sp. n. det. *E. Traugott-Olsen*; DNA sample 16852 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. michelseni*, labelled: Type [rounded with red margin]; Genital praeparat nr. D.15.1.90 sex: ♂ *E. Traugott-Olsen*; Wing praeparat nr. C.15.1.90; Tunisia, Nefta 14.–16.III. 1986 Zool. Mus. Copenhagen Exp.; Akvarel *E. Traugott-Olsen*; *Elachista michelseni* sp.



FIGURES 94–95. Male genitalia of *Elachista glaseri* Traugott-Olsen. 94. Spain (J. Tabell prep. 4407). 95. Holotype.

n. det. Traugott-Olsen; DNA sample 16850 Lepid. Phyl. (ZMUC). **Other material. Spain:** 3°03'20"E, 43°02'54"N, Alicante, Santa Pola, Playa del Pinet, 5 m, 5–6.VI.2005, 1 ♂, Ch. Wieser leg., DNA sample 16771 Lepid. Phyl. (Coll. Wieser); Alicante, Santa Pola, 1 km S Balsares, 50 m, salt marsh, 27.IV.2008, 2 ♂, Z. Tokár leg., DNA samples 20504–5 Lepid. Phyl. (Coll. Tokár); Alicante, Torre Vieja, 1 km W La Mata, 21.IV.2009, 5 ♂, J. Tabell leg. & Coll., Tabell prep. 4301, 4434, DNA samples 05557, 05558 Lepid. Phyl.; 3 km SW San Miguel de Salinas, e. l. ex *Lygeum spartum*, 13.III.2010, e.l. 6.IV.2010, 1 ♂, J. Tabell leg. & Coll., Tabell prep. 4598, DNA sample 05593; Albatera 7 km NNW, 200 m, 24.V.2009, 5 ♂, J. Tabell leg. & Coll., J. Tabell prep. 4323, 4373, 4407, DNA samples 05566, 05576 Lepid. Phyl.; 3.8 km NW Torremendo, 29.IV.2009, 1 ♂, J. Tabell leg. & Coll., J. Tabell prep. 4446, DNA sample 05581; 5.V.2009, 1 ♂, J. Tabell prep. 4433, DNA sample 05582 (Coll. Tabell); Almería, 37°34'N, 0°24'W, 10 km NNE Baza at Rio de Baza, 31.X.2005, 1 ♂, B. Skule & P. Skou leg., L. Kaila prep. 4778 (ZMUC); Almería, Camping Cabo de Gata, 9–11.IV.1997, 1 ♂, H. W. v. d. Wolf leg., L. Kaila prep. 3934, DNA sample 11330 Lepid. Phyl. (MZH); Almería, 6 km SW Tabernas, Mini Hollywood, 12.IV.1997, 1 ♂, H. W. v. d. Wolf leg., L. Kaila prep. 3933, DNA sample 20874 Lepid. Phyl. (MZH); 20 km N Almería, 5.IV.2002, 2 ♂, 12.IX.2004, 2 ♂, 22.IV.2009, 6 ♂, T. & K. Nupponen leg., DNA samples 11424, 11425, 11428, 11432, 15325, 15329, 15335, 15336, 15339, 15340 Lepid. Phyl. (Coll. Nupponen); Almería, Tabernas env., Aghuila Salada, 420 m, 20–21.IV.2009, 5 ♂, Z. Tokár leg., L. Kaila prep. 5741, DNA samples 19998–20000, 20501 Lepid. Phyl. (Coll. Tokár, MZH); Almería, 1 km SW Tabernas, 380 m, 18.IX.2012, 12 ♂, 18.IX.2013, 9 ♂, J. Tabell leg. (Coll. Tabell); 15 km NNE Tabernas, 770 m, 22.IX.2012, 1 ♂, J. Tabell leg., J. Tabell prep. 4742 (Coll. Tabell); Almería, 10 km NW Almería, 20–21.IV.1991, 3 ♂, J. Junnilainen leg., L. Kaila prep. 4988, 4089, 4091, DNA samples 11331–3 (Coll. Junnilainen); Almería, 37°N, 2°26'W, 3 km W Tabernas, 30.IX.2001, 4 ♂, C. & F. K. Gielis leg., L. Kaila prep. 4245–4248, DNA sample 11334–5 Lepid. Phyl. (MZH); Almería, Rambla de Tabernas, 19.IV.2010, 1 ♂, H. Rietz leg., DNA sample 22117 Lepid. Phyl., L. Kaila prep. 5541 (Coll. Roweck via Savenkov); Almería, 37°01'N, 2°25'W, Rambla, 5 km W Tabernas, 350 m, 2.IX.2001, 2 ♂, B. Skule & C. Hviid leg., L. Kaila prep. 4697, 4699 (ZMUC);



FIGURES 96–97. Male genitalia of *Elachista glaseri* Traugott-Olsen. 96. *E. rikkeae* Traugott-Olsen, holotype. 97. *E. olemartini* Traugott-Olsen, holotype.

Almeria, b. Garrucha, 5 m, Camping La Palmeras, 4–6.X.1974, 1 ♂, H. G. Amsel & R. U. Roesler leg., L. Kaila prep. 5819 (SMNK); Aragon, Prov. Zaragoza, Los Monegros 8 km NNE Gelsa, 270 m, 21.V.2007, 4 ♂, J. Tabell prep. 4467, DNA samples 11411–4 Lepid. Phyl. (Coll. Nupponen); Aragon, Teruel, 5 km E Albarracin, 13.VI.2004, 1 ♂, T. Nupponen leg., J. Tabell prep. 4469, DNA sample 11430 Lepid. Phyl. (Coll. Nupponen); Aragon, Prov. Zaragoza, Los Monegros, 5 km E Monegrillo, 17–IX.2007, 1 ♂, T. Nupponen leg., DNA sample 11415 Lepid. Phyl. (Coll. Nupponen); Aragon, Los Monegros, 7 km N Caspe, 1 ♂, J. Junnilainen leg., J. Tabell prep. 4584, DNA sample 11403 Lepid. Phyl. (Coll. Junnilainen); Granada, Rio de Baza, 15.IX.2004, 1 ♂, K. Nupponen leg., DNA sample 11431 Lepid. Phyl. (Coll. Nupponen); Granada, 15 km NE Baza, 13.IX.2013, 1 ♂, T. Nupponen leg., L. Kaila prep. 5824 (Coll. Nupponen); Granada, Baza, 110 km NE Granada, 10–17.V.1975, 11 ♂, M. u. W. Glaser leg., L. Kaila prep. 5807 (SMNK); Granada, 5.5 km N Cúllar, 880 m, 11.VI.2010, 1 ♂, J. Tabell leg., J. Tabell prep. 4657, DNA sample 16255 (Coll. Tabell); 10 km NE Baza, 700 m, 20.IX.2012, 1 ♂, J. Tabell leg. (Coll. Tabell); Huesca, Penalba 28.VI.1986 1 ♂ P. Skou leg., L. Kaila prep. 4692 (ZMUC); Murcia, 4 km SW Aguilas, 14–15.IV.1997, 2 ♂, 20–22.IX.1995, 3 ♂, H. W. v. d. Wolf leg., *Elachista casascoensis*, det. Traugott-Olsen, L. Kaila prep. 3920, 3932, 3937, 3938, Traugott-Olsen prep B.2.8.96, DNA samples 11326–9 (MZH); Murcia, Alhama de Murcia, Sierra d’Espuña, 25.VI.1971, 4 ♂, 28.IX.1973, 1 ♂, 9.IX.1974, 1 ♂, 20.IX.1974, 6 ♂, 9.X.1976, 3 ♂, all M. u. W. Glaser leg., L. Kaila prep. 5810, 5811, 5812 (SMNK); Murcia, 1 km SE Los Belones, 75 m, 18.III.2010, 1 ♂, J. Tabell leg., J. Tabell prep. 4591, DNA sample 05583; ex *Lygeum spartum*, 18.III.2010,

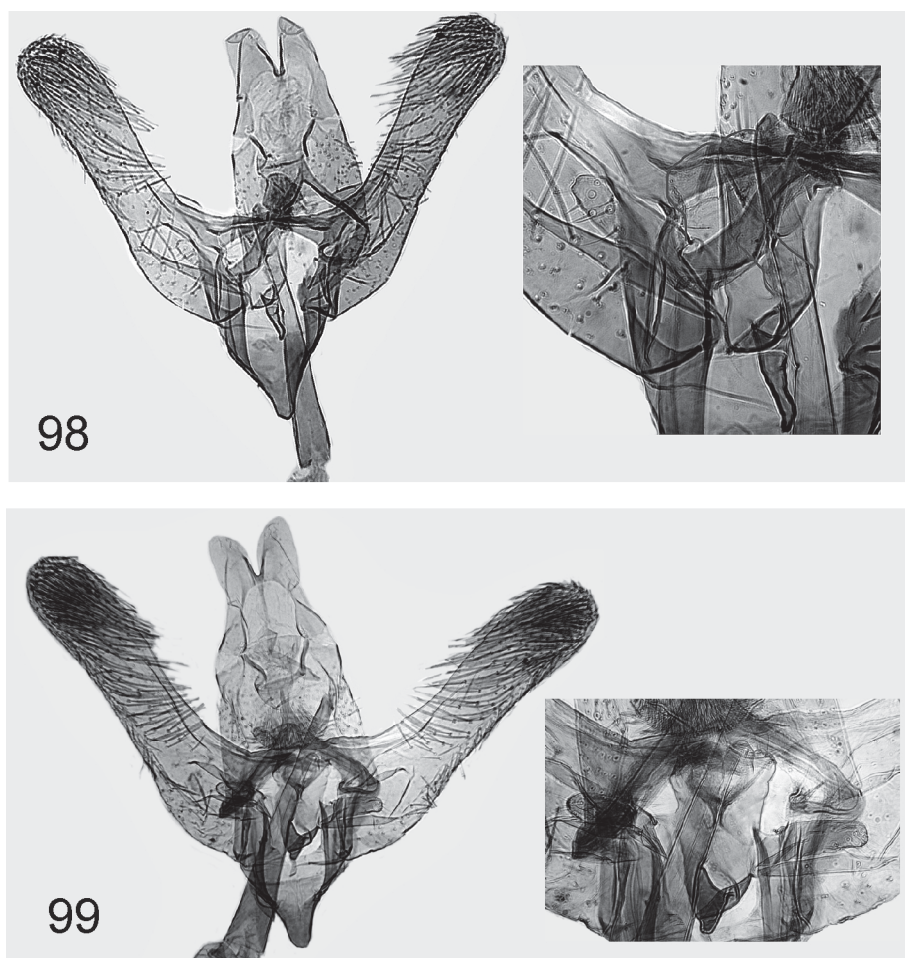
e.l. 5–8.IV.2010, 4 ♀, J. Tabell leg., J. Tabell prep. 4669, 4675, DNA sample 05595 (Coll. Tabell); Sevilla, Guadalquivir, Trebujena, 15.V.1977, 1 ♂, M. u. W. Glaser leg., L. Kaila prep. 5813 (SMNK); Sevilla, Puerto real, Chiclana Orstrand, 30 m, 24–28.IX.1974, 1 ♂, H. G. Amsel & R. U. Roesler leg., L. Kaila prep. 5816 (SMNK). **Tunisia:** 20 km Hammamet Sebkha Si. Kralifa, 6.II.1980, 1 ♂, M. u. E. Arenberger leg., L. Kaila prep. 5753 (ZSM); SW Tunisia, 6 km W Nefta, Sahara semidesert, 50 m, 29.IV.2000, 2 ♂, 1 ♀, K. Nupponen leg., L. Kaila prep. 5727, DNA samples 11409, 1148–9 Lepid. Phyl. (Coll. Nupponen).

Diagnosis. *E. glaseri* is variable in size and forewing maculation that varies, without discrete forms, from white to mottled. No geographic pattern regarding this variation nor correlation with barcodes or genital morphology has been detected, supporting the view that only one variable species is involved.

Biology. Bivoltine. Larva feeds on *Lygeum spartum* L. (Poaceae) (J. Tabell, personal communication).

Distribution. Libya, Morocco, Spain, Tunisia.

Remarks. The holotype genitalia of *E. glaseri* are lacking the tegumen and uncus. The remaining genitalia are identical with other taxa considered synonyms of it. The habitat of this species is characteristic with the larval host plant abundant. *E. glaseri* is referred to as OTU 12 in Mutanen *et al.* (2015).



FIGURES 98–99. Male genitalia of *Elachista glaseri* Traugott-Olsen. 98. *E. bengtssoni* Traugott-Olsen, holotype. 99. *E. senecai* Traugott-Olsen, holotype.

***Elachista hispanica* Traugott-Olsen, 1992**

Figs. 40–45, 103–110, 139

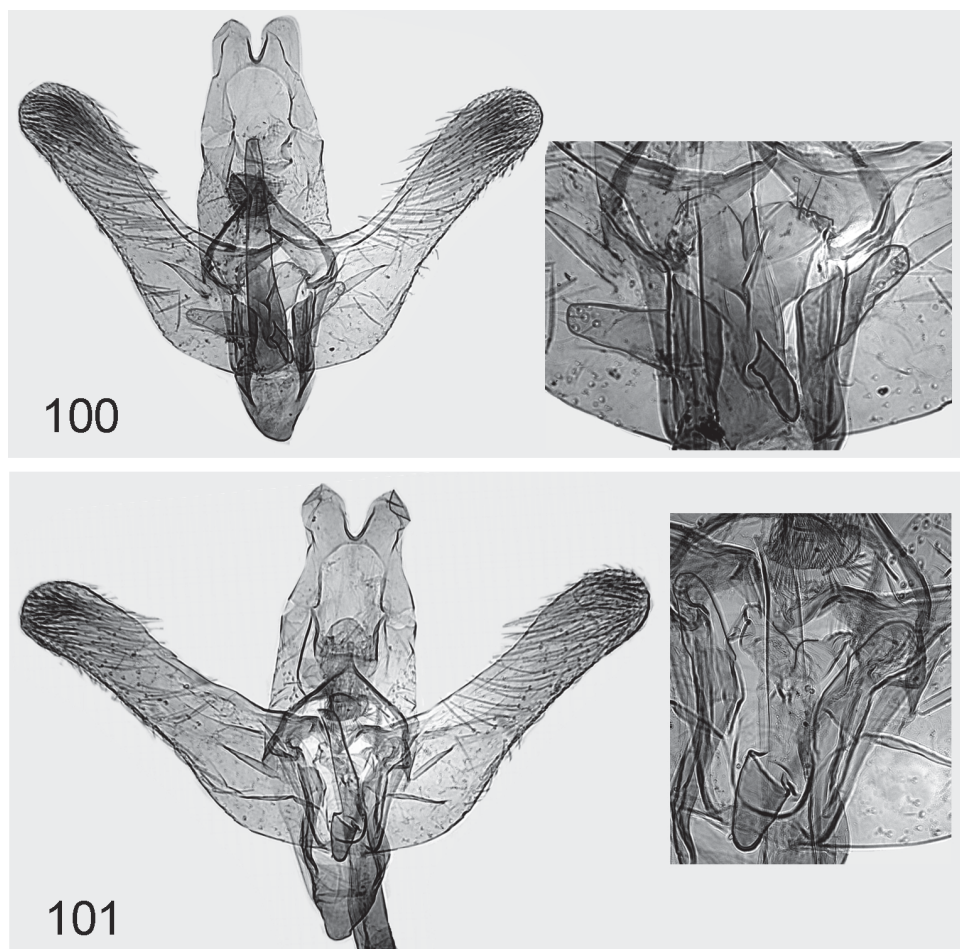
Elachista hispanica Traugott-Olsen, 1992: 214.

Elachista vivesi Traugott-Olsen, 1992: 213. **Syn. nov.**

Elachista cuencaensis Traugott-Olsen, 1992: 212. **Syn. nov.**

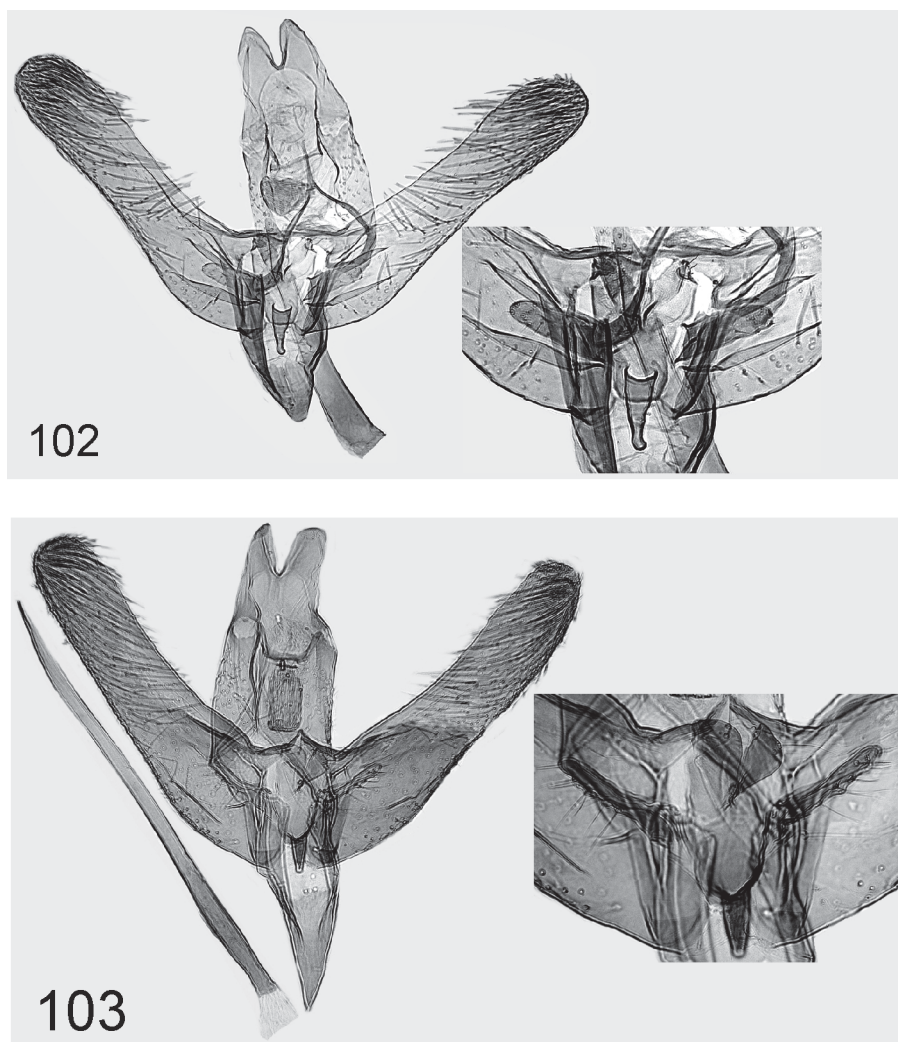
Elachista vanderwolfi Traugott-Olsen, 1992: 124. **Syn. nov.**

Elachista amparoae Traugott-Olsen, 1992: 231. **Syn. nov.**
Elachista varensis Traugott-Olsen, 1992: 232. **Syn. nov.**
Elachista luqueti Traugott-Olsen, 1992: 209. **Syn. nov.**
Elachista occidentella Traugott-Olsen, 1992: 207. **Syn. nov.**
Elachista clintoni Traugott-Olsen, 1992: 208. **Syn. nov.**



FIGURES 100–101. Male genitalia of *Elachista glaseri* Traugott-Olsen. 100. *E. wadielhiraensis* Traugott-Olsen, holotype. 101. *E. rissaniensis* Traugott-Olsen, holotype.

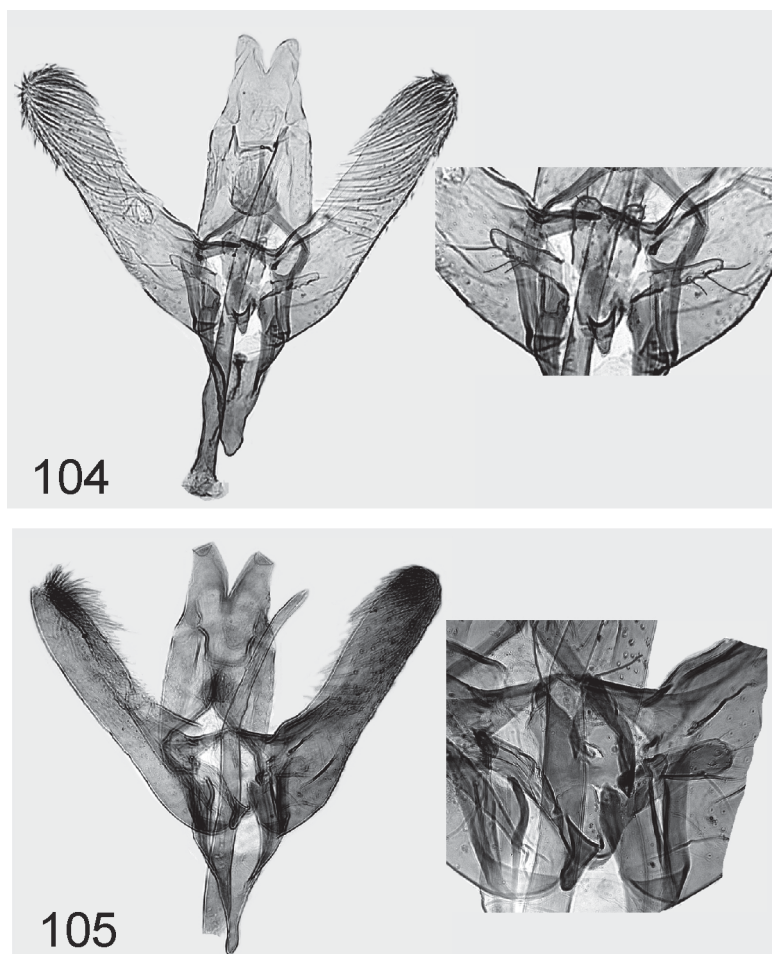
Material studied. Type material. Holotype ♂ of *E. hispanica* labelled: Type [rounded with red margin]; Genital praeparat nr. C.19.6.85 sex: ♂ *E.* Traugott-Olsen; Wing praeparat nr. 25.10.89 sex: ♂ *E.* Traugott-Olsen; Hispania, Cataluna, Collado de Falset 3.7.1967 leg. *E.* Arenberger; *Elachista hispanica* sp. n. det. *E.* Traugott-Olsen; DNA sample 16855 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. vivesi* labelled: Type [rounded with red margin]; Wing praeparat nr. A. 27.10.89 sex: ♂ *E.* Traugott-Olsen; Campo Real, Madrid, 640 m, 19.9.1979 A. Vives leg.; Genitalia no 1572 ♂ *Elachista vivesi* Tr.-O. Antonio Vives det.; Holotipo [red]; MNCN Cat. Tipos No 11500 [red]; MNCN Prep. Gen 60978, 60979; MNCN_Ent No Cat. 42013 (MNCN, Madrid). Holotype ♂ of *E. vanderwolfi* labelled: Type [rounded with red margin]; France Drôme, la Penneze-s-l-Ouvèze 25.–27.VII.1986 H. W. v. d. Wolf; Genital praeparat nr. D.11.8.88 sex: ♂ *E.* Traugott-Olsen H. W. v. d. Wolf; Wing praeparat nr. A.16.9.89 sex: ♂ *E.* Traugott-Olsen; *Elachista vanderwolfi* sp. n. det. *E.* Traugott-Olsen; DNA sample 16837 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. amparoae* labelled: Type [rounded with red margin]; Genital praeparat nr. H. 22.1.88 sex: ♂ *E.* Traugott-Olsen; Wing praeparat nr. B. 16.9.89 sex: ♂ *E.* Traugott-Olsen; Spain Albacete Paterna del Madera, 1350 m, 18.7.1986 C. Gielis leg.; *Elachista amparoae* sp. n. det. *E.* Traugott-Olsen (RMNH, Leiden). Holotype ♂ of *E. varensis* labelled: Type [rounded with red margin]; Genital praeparat nr. I. 19.6.89 sex: ♂ *E.* Traugott-Olsen; France, Var, 20 km S. St. Tropez, Cap Cartaya, Plage de l'Escalet 8.IV.1988, sea level, O. Karsholt & N. P. Kristensen leg.; *Elachista varensis* sp. n. det. *E.* Traugott-Olsen; DNA sample 16844 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. occidentella*, labelled: Type [rounded with red margin]; Portugal, Ext. 3 km E Cabo da Roca, 200 m, 8.VII.1986 O. Karsholt leg.; Genital praeparat nr. D.19.1.88 sex: ♂ *E.* Traugott-Olsen ZMUC; Wing genital



FIGURES 102–103. Male genitalia of *Elachista* spp. 102. *E. glaseri* Traugott-Olsen, holotype of *E. michelseni* Traugott-Olsen. 103. *E. hispanica* Traugott-Olsen, Spain (L. Kaila prep. 5739)

praeparat nr. B.25.10.89 sex: ♂ *E. Traugott-Olsen*; leg. O. Karsholt; *Elachista occidentella* sp. n. det. *E. Traugott-Olsen*; DNA sample 16835 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. clintoni*: slide labelled: Brit. Mus. (Nat. Hist.) Microlepidoptera ♂ 21929 ETO A11.1.86 Euparal; *Elachista clintoni* Traugott-Olsen; S. France, Cannes II.IV.1881 Wlsm. 85306 HOLOTYPE (BMNH). **Other material. France:** 3°03'20"E 43°02'54"N, Narbonne, Salins de Saint Lucia, 30–31.VIII.2005, 2 ♂, Ch. Wieser leg., DNA samples 16765, 16799 Lepid. Phyl. (Coll. Wieser, 1 ♂ in MZH); Bouches du Rhone, Camargue, 23.IX.1974, 1 ♂, 1 ♀, M. & W. Glaser leg., L. Kaila prep. 5733, 5739 (SMNK); St. Jean du Gard, 16–30.VII.2007, 1 ♂, L. Kaila prep. 4970 (Coll. Wikström); Provence, 4 km N Euguians, 4.VII.1989, 1 ♂, B. Bengtsson leg., Bengtsson prep. 3369, *E. baldizzonella* *E. Traugott-Olsen* det. (Coll. Bengtsson); RN06 Alpes Maritimes, 2 km NW Grasse, 550 m, 22.IV.2003, 2 ♂, J. Junnilainen leg., L. Kaila prep. 5906, J. Tabell prep. 4479, DNA sample 21408 (Coll. Junnilainen, MZH); Var, RN83, 5 km SE Le Lac, Garces, 1.IV.2003, 2 ♂, J. Junnilainen leg., L. Kaila prep. 5907, J. Tabell prep. 4476, DNA sample 21409 (Coll. Junnilainen). **Portugal:** Algarve, Pr. Bensafim, 4.IX.1973, 1 ♂, P. Grotenfelt leg., L. Kaila prep. 4706 (MZH). **Russia:** Belgorod GECN5040E3615, 1–7.VI.2006, 1 ♂, K. Lundsten leg., L. Kaila prep. 4969 (MZH). **Spain:** Almeria, Puerto Ragua, 2000 m, 9.VII.1981, 1 ♂, P. Stadel Nielsen leg., L. Kaila prep. 4682 (ZMUC); Granada, 37°32'40"N, 2°33'11"W, 6 km N Baza, 1.XI.2001, 2 ♂, C. & F. K. Gielis leg., L. Kaila prep. 4244, DNA samples 11346, 11377 Lepid. Phyl. (MZH); Granada, Pierto de la Mora, 1300 m, 13.IX.1974, 4 ♂, Glaser leg., L. Kaila prep. 5814, 5815 (SMNK); Granada, Veleta, 3100 m, 28.VII.1999, 1 ♂, J. Junnilainen leg., L. Kaila prep. 4094, DNA sample 11363 Lepid. Phyl. (Coll. Junnilainen); Valencia, 39°19'67"N, 0°18'46"E, Albufera, 5 m, 8–9.IX.2005, 2 ♂, Ch. Wieser leg., DNA samples 16766, 16767 Lepid. Phyl. (Coll. Wieser); 39°19'67"N,

0°18'47"E, Albufera, El Saler, 5 m, 7.IX.2005, 1 ♂, P. Huemer leg., DNA sample 16745 (TLMF); Tarragona, 5 km S. of St. Carles de la Ràpita, 20 m, 14.VI.1999, 1 ♂, P. Skou leg., L. Kaila 4700 (ZMUC); Prov. Zaragoza, 4112'30"N, 111'36"W, 3 km E Cerveruela at Rio del Huelva, 800 m, 7.VII.2002, 1 ♂, B. Skule leg., L. Kaila prep. 4294 (ZMUC); Teruel, 4 km E Cosa, 28.VIII.2000, 1 ♂, HW VD Wolf leg, L. Kaila prep. 3919, DNA sample 11375 (MZH).



FIGURES 104–105. Male genitalia of *Elachista hispanica* Traugott-Olsen. 104. Holotype. 105. *E. vivesi* Traugott-Olsen, holotype.

Diagnosis. The male of *Elachista hispanica* is characterized by a very long phallus, length 1.2 times than that of the valva. The female genitalia are characterized by the very wide ostium bursae, posteriorly abruptly tapered, deep and narrow antrum, relatively short and the broad ductus bursae that is incepted on the corpus bursae with distinct junction, and the absence of an appendix bursae.

Distribution. France, Portugal, Russia, Spain.

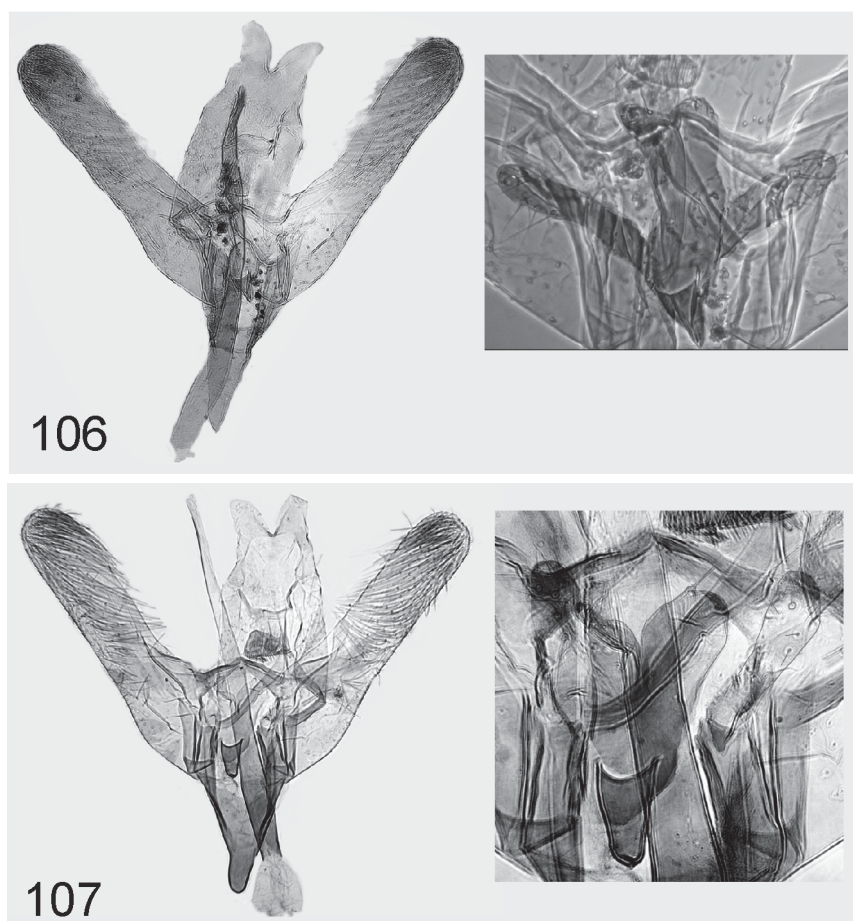
Remarks. Traugott-Olsen considered the large pinaculae on the bases of setae on the digitate process as a diagnostic character of *E. clintoni*. Such pinaculae are present in all the taxa examined and these are all considered synonyms of *E. hispanica*. The aquarelle of the habitus of *E. luqueti* in Traugott-Olsen (1992) has been painted from a misidentified specimen that belongs to the *E. pollinariella* group, in MZH. *E. hispanica* is referred to as OTU 15 in Mutanen *et al.* (2015).

***Elachista berndtiella* Traugott-Olsen, 1985**

Figs. 46–47, 111–113

Elachista berndtiella Traugott-Olsen, 1985: 73.

Elachista casascoensis Traugott-Olsen, 1992: 217. **Syn. nov.**



FIGURES 106–107. Male genitalia of *Elachista hispanica* Traugott-Olsen. 106. *E. vanderwolfi* Traugott-Olsen, holotype. 107. *E. amparoae* Traugott-Olsen, holotype.

Material studied. Type material. Holotype ♂ of *E. berndtiella* labelled: Type [rounded with red margin]; Genital praeparat nr. 5671 sex: ♂ *E. Traugott-Olsen*; Hispania, Andalucia, Sierra Nevada, Cam. d. Veleta 2000 m, 24.7.1983 *E. Traugott-Olsen* leg. *Elachista berndtiella* sp. n. det. *E. Traugott-Olsen*; DNA sample 16853 Lepid. Phyl. (ZMUC). Holotype ♂ of *E. casascoensis* labelled: Type [rounded with red margin]; Italy Piemonte, Val Curone (Pr. AL) Poggio de Casasco 7.VII.1984 (lux) G. Baldizzone leg.; Genital praeparat nr. 6017 sex: ♂ *E. Traugott-Olsen*; Wing praeparat nr. D.1.11.91 sex: ♂ *E. Traugott-Olsen*; *Elachista casascoensis* sp. n. det. *E. Traugott-Olsen* (ZMUC). **Other material. France:** Alpes Maritimes, Mercantour Nat. Pk., S of Tende, Saorge, 12.VIII.2007, 1 ♂, M. Fibiger & O. Karsholt leg., L. Kaila prep. 5834 (ZMUC); Alpes Maritimes, Vallée de la Vésubie, 9.VI.1998, 1 ♂, K. Silvonen leg., L. Kaila prep. 4227, DNA sample 11344 Lepid. Phyl. (MZH); Alpes Maritimes, St.-Martin de Peille, 7.VI.1998, 1 ♂, K. Silvonen leg., L. Kaila prep. 4229, DNA sample 11345 Lepid. Phyl. (MZH); Dept. Vaucluse, 4 km NW of Cèreste, St. Paul by Viens, 500 m, 3.VIII.2000, 1 ♂, P. Skou leg., L. Kaila prep. 5836 (ZMUC). **Germany:** Rhld.-Pfalz, 5.VII.1983, 2 ♂, H.W. v.d. Wolf leg., L. Kaila prep. 3923, DNA sample 11343 Lepid. Phyl. (MZH). **Spain:** Aragon, prov. Teruel, 9 km NNE Teruel, Villalba Baja, 960–1030 m, 13.VI.2008, 2 ♂, K. Nupponen leg., DNA sample 11417–8 Lepid. Phyl., J. Tabell prep. 4664 (Coll. Nupponen); Aragon, Prov. Teruel, Albarracin, Val de Vecar, 1100 m, 22.V.1998, 1 ♂, P. Skou leg., L. Kaila prep 4687 (ZMUC); Aragon, Teruel, 5 km E Albarracin, 11.VI.2004, 1 ♂, T. Nupponen leg., J. Tabell prep. 4468, DNA sample 11429 Lepid. Phyl. (Coll. Nupponen); Aragon, Teruel, Albarracin, 18.VI.2004, 2 ♂, J. Junnilainen leg., J. Tabell prep. 4605, DNA sample 11404 Lepid. Phyl. (Coll. Junnilainen); Prov. Avila, Sierra de Gredos, 10 km S. Hoyos del Espino, 1700 m, 22.VII.1995, 2 ♂, P. Skou leg., L. Kaila prep. 4690, 4691 (ZMUC); 4012.74°N, 0020.89°W, Castellon, Penyagolosa N-Hang, Banyadera, 1500 m, 31.XIII.2005, 3 ♂, P. Huemer leg., DNA samples 16800–2 (TLMF); Castellon, 20 km SE Morella, 15.VI.1989, 1 ♂, B. Bengtsson leg., Bengtsson prep. 3355 (Coll. Bengtsson); Prov. Cuenca, Castilla-La Mancha, 7 km ESE Fuentes, 970–1100 m, 10–12.VI.2008, 3 ♂, K.

Nupponen leg., L. Kaila prep. 5358, 5359, DNA samples 11419–21 Lepid. Phyl., same locality, 15.VII.2010, 1 ♂, T. Nupponen leg., L. Kaila prep. 5357, DNA sample 15478 Lepid. Phyl. (Coll. Nupponen); Prov. Granada, Sierra Nevada, 700 m, 8.VI.1975, 1 ♂, M. & W. Glaser leg., L. Kaila prep. 5823 (SMNK); Granada, Sierra Nevada, 1900 m, 27.VII.2003, 1 ♂, T. Nupponen leg., DNA sample 11422 Lepid. Phyl., 2050 m, 20 km SE Granada, 28.VII.2003, 1 ♂, T. Nupponen leg., L. Kaila prep. 5361, DNA sample 11427 Lepid. Phyl. (Coll. Nupponen); Granada, Pico Veleta, N. side, 1600 m, 18.VI.1989, 1 ♂, B. Å. Bengtsson leg., Bengtsson prep. 3358 (Coll. Bengtsson); Prov. Huesca, 42°01'30"N, 0°31'52"E, Estenja, 700 m, 8.IX.2001, 1 ♂, B. Skule & C. Hviid leg., L. Kaila prep. 4293 (ZMUC); Prov. Teruel, 48°28'08"N, 1°37'57"W, Puerto de Orihuela, 1650 m, 23.VIII.2001, 1 ♂, B. Skule & C. Hviid leg., L. Kaila prep. 4698 (ZMUC); Prov. Zaragoza, 4 km N Tosos, 400 m, 28.IV.1997, 1 ♂, P. Skou leg., L. Kaila prep. 4696 (ZMUC).

Diagnosis. *E. berndtiella* is characterized by the large, elongate juxta lobes that are longer than uncus lobes, different from any other species in the *E. dispunctella* complex. The phallus is bent, acute-tipped, and stout. The female is unknown.

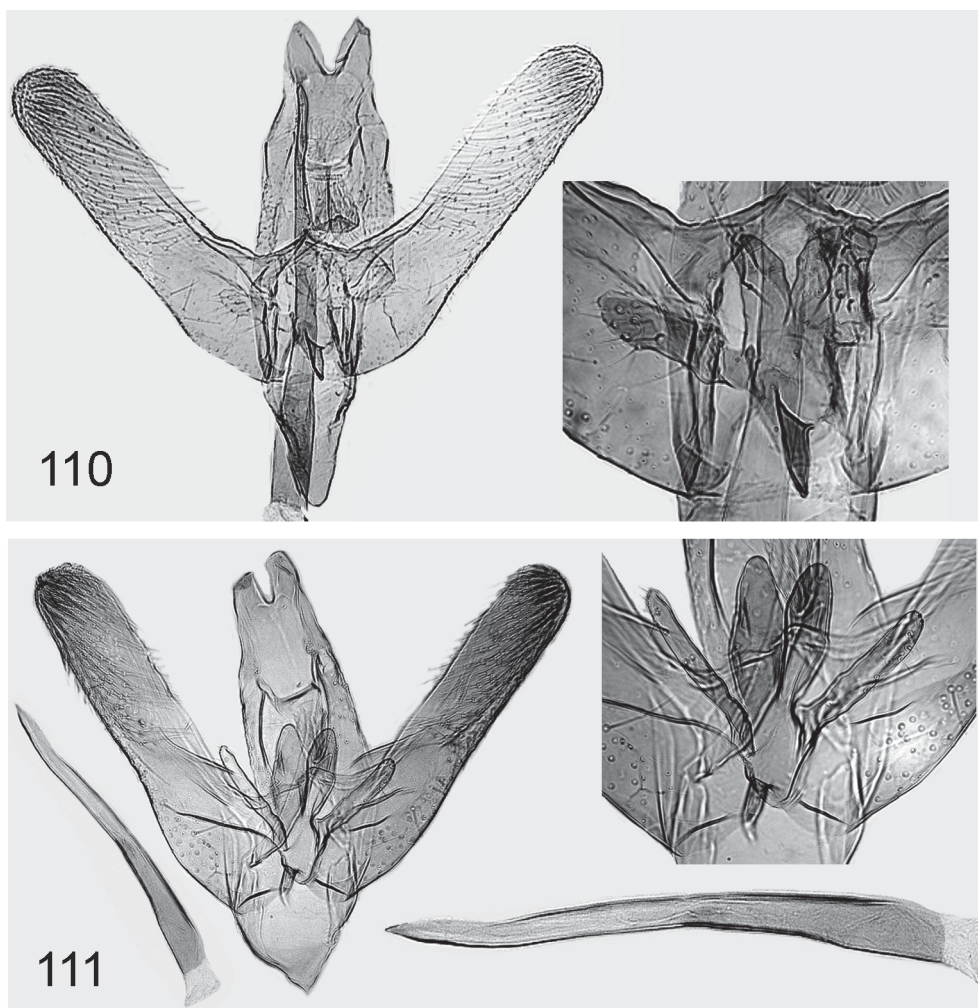
Biology. *E. berndtiella* inhabits xerothermic limestone habitats. The immature stages are unknown.

Distribution. France, Germany, Italy, Spain.

Remarks. *E. berndtiella* is referred to as OTU 7 in Mutanen *et al.* (2015).



FIGURES 108–109. Male genitalia of *Elachista* *E. hispanica*. 108. *E. varensis* Traugott-Olsen, holotype. 109. *E. occidentella* Traugott-Olsen, holotype.



FIGURES 110–111. Male genitalia of *Elachista* spp. 110. *E. hispanica* Traugott-Olsen, holotype of *E. clintoni* Traugott-Olsen. 111. *E. berndtiella* Traugott-Olsen, Spain (L. Kaila prep. 4691).

***Elachista triseriatella* Stainton, 1854**

Figs. 48–50, 114–116, 140

Elachista triseriatella Stainton, 1854: 261.

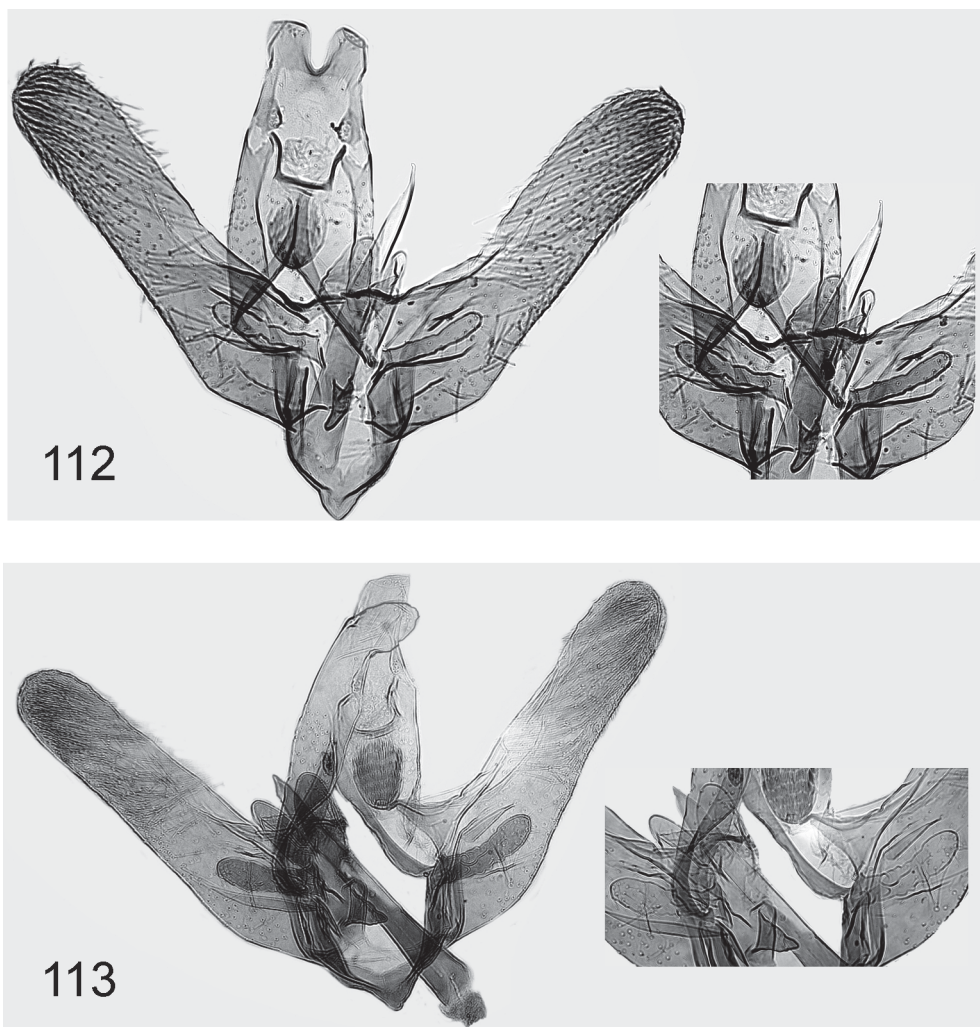
Elachista contisella Chrétien, 1922: 121. **Syn. nov.**

Elachista gregori Traugott-Olsen, 1988: 297. **Syn. nov.**

Elachista lerauti Traugott-Olsen, 1992: 252. **Syn. nov.**

Material studied. Type material. Holotype ♂ of *E. gregori*: labelled: Holotype [rounded with red margin]; Genital praeparat nr. B.24.11.86 sex: ♂ E. Traugott-Olsen; Hainburger Berge, Austria inter. 26.5.1962 W. Glaser. *Elachista gregorella* [sic] n. sp. det. E. Traugott-Olsen; gen. prep. B.24.11.86. E. Traugott-Olsen, Holotype, Coll. Glaser. LNK. (SMNK). **Other material. Denmark:** Kergårda, PI7, W.J. 16.VI.1 ♂ P. Falck leg., DNA sample 22227 (Coll. P. Falck); HO, WJ 6.VI.1992 1 ♂ 1 ♀ P. Falck leg., L. Kaila prep. 3465, 5774, DNA samples 21437, 21438 Lepid. Phyl. (Coll. Kaitila). **Great Britain:** Devon, Petit Tor Point, Torquay, SX927663 VC3, 3.VII.1987, 1 ♂, J. Tabell prep. 4697, R. J. Heckford leg. (Coll. Tabell). **Latvia:** Tal., Slitere, Vaide, 21.6.2000, 1 ♂, N. Savenkov leg., J. Tabell prep. 4755 (Coll. Tabell). **Slovakia:** 1 km N. Muráň, 12.VI.1987, 1 ♂, B. Bengtsson leg., Bengtsson prep. 2699 (Coll. Bengtsson); Slov. kras-Zádiel, 27.V.2001, 1 ♂, Z. Tokár leg., L. Kaila prep. 5440, DNA sample 21349 (Coll. Tokár); 8, Hliník. 2.H.46, 1 ♂, J. Patocka leg., L. Kaila prep. 3067 (ZMUC). **Spain:** Granada, Sierra Nevada, 1.5 km S Puerto de la Ragua, 2000 m, 7.VI.2010, 1 ♂, 1 ♀, J. Tabell leg. & Coll., DNA sample 16252

Lepid. Phyl.; 8.VI.2010, 14 ♂, 4 ♀, (two pairs in copula), J. Tabell prep. 4639, 4685, L. Kaila 5743, 5744, DNA samples 16250–1 (Coll. Tabell, MZH); Granada, Sierra Nevada, 2900 m, 20 km SE Granada, 12.VII.2010, 1 ♂, T. Nupponen leg., L. Kaila prep. 5705, DNA sample 15483 (Coll. Nupponen).



FIGURES 112–113. Male genitalia of *Elachista berndtiella* Traugott-Olsen. 112. Holotype. 113. *E. casascoensis* Traugott-Olsen, holotype.

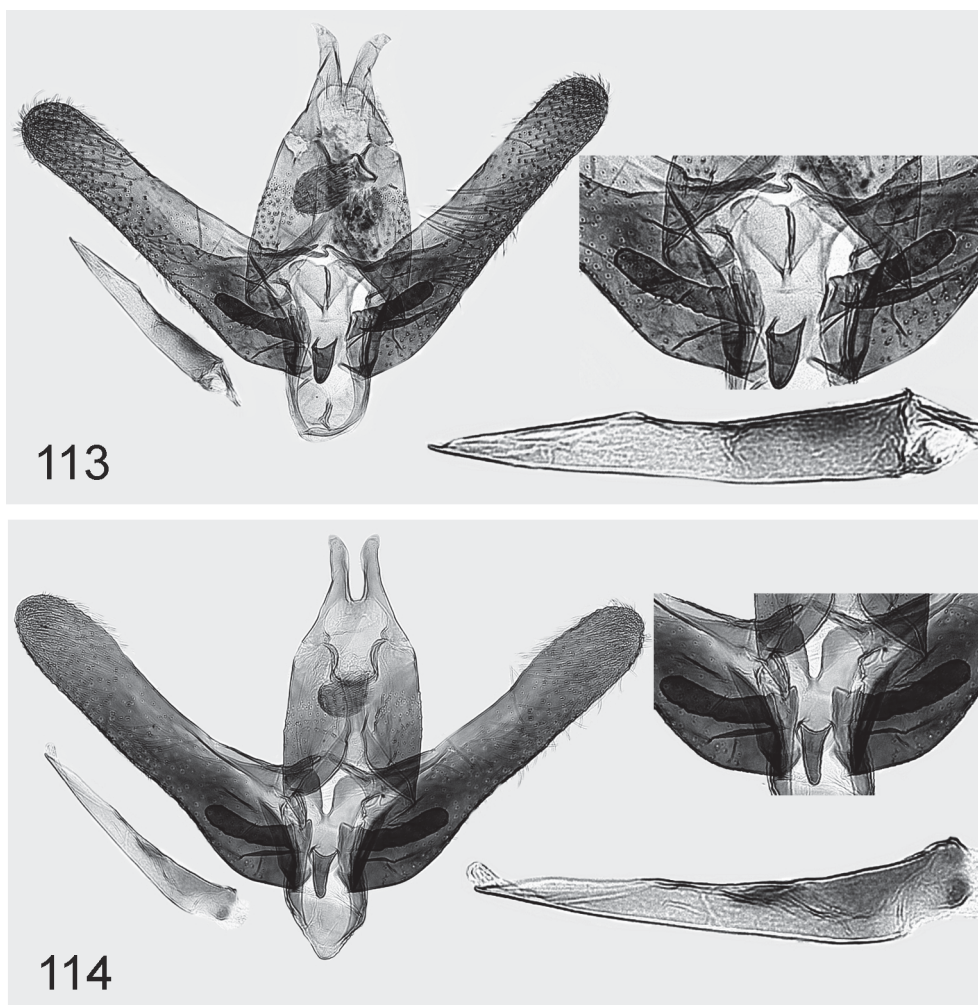
Diagnosis. *E. triseriatella* is a small species, usually with pale grey (sometimes white) forewing ground colour. The male genitalia are characterized by the narrow uncus lobes, and the distinctly sclerotized, parallel-sided and rather long digitate process. The female genitalia have a characteristic signum, consisting of two longitudinal, dentate rows. In the characterization of *E. triseriatella*, Traugott-Olsen (1988) depicts the signum of *E. gregori* as such, but that of *E. triseriatella* as a single dentate sclerotization. This seems to be a misinterpretation, as Bland (1996) illustrates the signum of a British *E. triseriatella* as consisting of two rows. *E. triseriatella* has a characteristic sclerotization laterad of ostium bursae. *E. oukaïmedenensis* has also such a sclerotization, but it is much broader than in *E. triseriatella*.

Biology. In Britain, *E. triseriatella* inhabits open grasslands, both coastal and inland (Heckford 2010). In Denmark it has been found in coastal sand dunes (P. Falck and O. Karsholt, personal communication). The larva may be a leaf-miner within the leaves of *Festuca ovina* L. (for a review, see Heckford 2010).

Distribution. Austria, Denmark, France, Germany (Biesenbaum 1995), Great Britain, Latvia, Slovakia, Spain.

Remarks. The holotype of *E. triseriatella* is depicted by Traugott-Olsen (1988), that of *E. contisella* by Parenti (1972), and that of *E. lerauti* by Traugott-Olsen (1992). These types, as well as the holotype of *E. gregori*, are identical to *E. triseriatella* and here considered conspecific. The artificial distinction of the *E. dispunctella* and *E. triseriatella* groups by Traugott-Olsen (1988, 1992) is flagshipped by this species, which appears to occur under

two names in both publications. The record from Germany (as *E. gregori* in Biesenbaum 1995) has not been checked, but is reliable on the basis of illustration of the genitalia of a German specimen (Biesenbaum 1995). *E. triseriatella* is referred to as OTU 5 in Mutanen *et al.* (2015).



FIGURES 114–115. Male genitalia of *Elachista triseriatella* Stainton. 114. England (J. Tabell prep. 4687). 115. Spain (J. Tabell prep. 4639).

***Elachista andorraensis* Traugott-Olsen, 1988**

Elachista andorraensis Traugott-Olsen, 1988: 308.

Material studied. No specimens examined.

Distribution. Andorra.

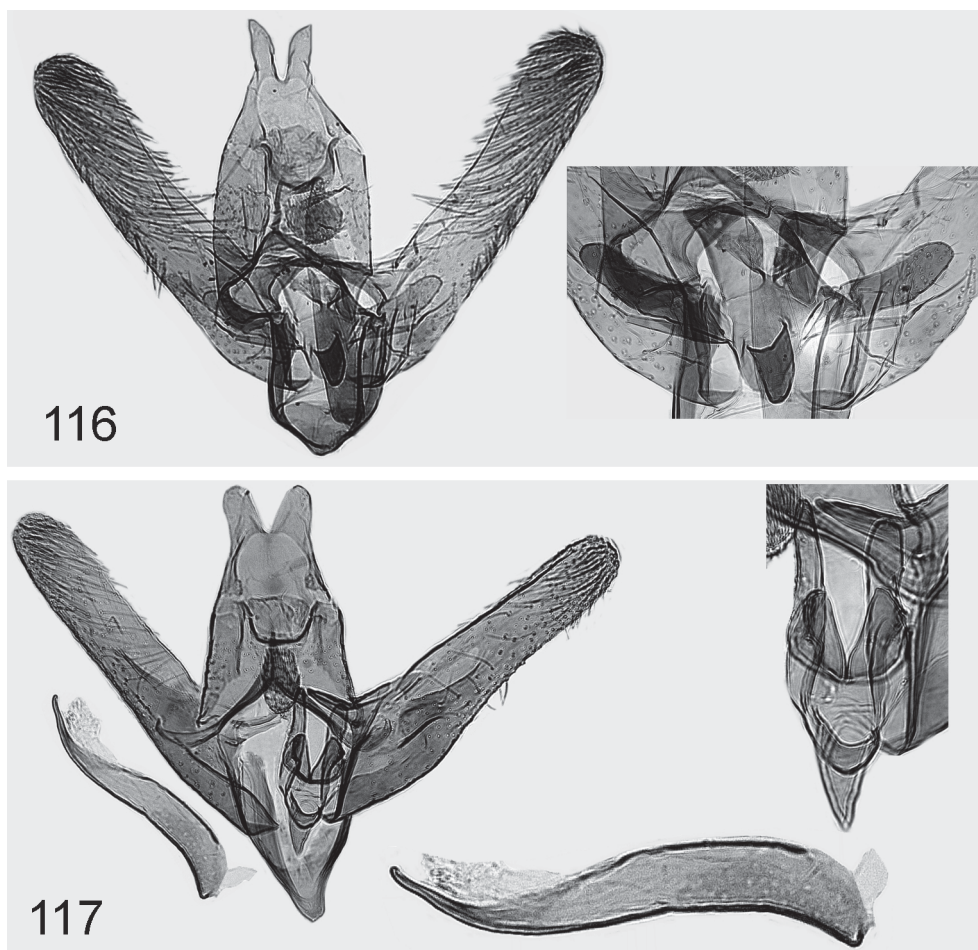
Remarks. The species was described on the basis of a single male with incomplete genitalia. It is close to, if not conspecific with, *E. triseriatella* based on those characters that remain (see Traugott-Olsen 1988). Its status can be established only with further material from the type locality (Andorra).

***Elachista elsabella* Traugott-Olsen, 1988**

Figs. 51–52, 117–119, 141–144

Elachista elsabella Traugott-Olsen, 1988: 302.

Elachista svenssoni Traugott-Olsen, 1988: 300. **Syn. nov.**

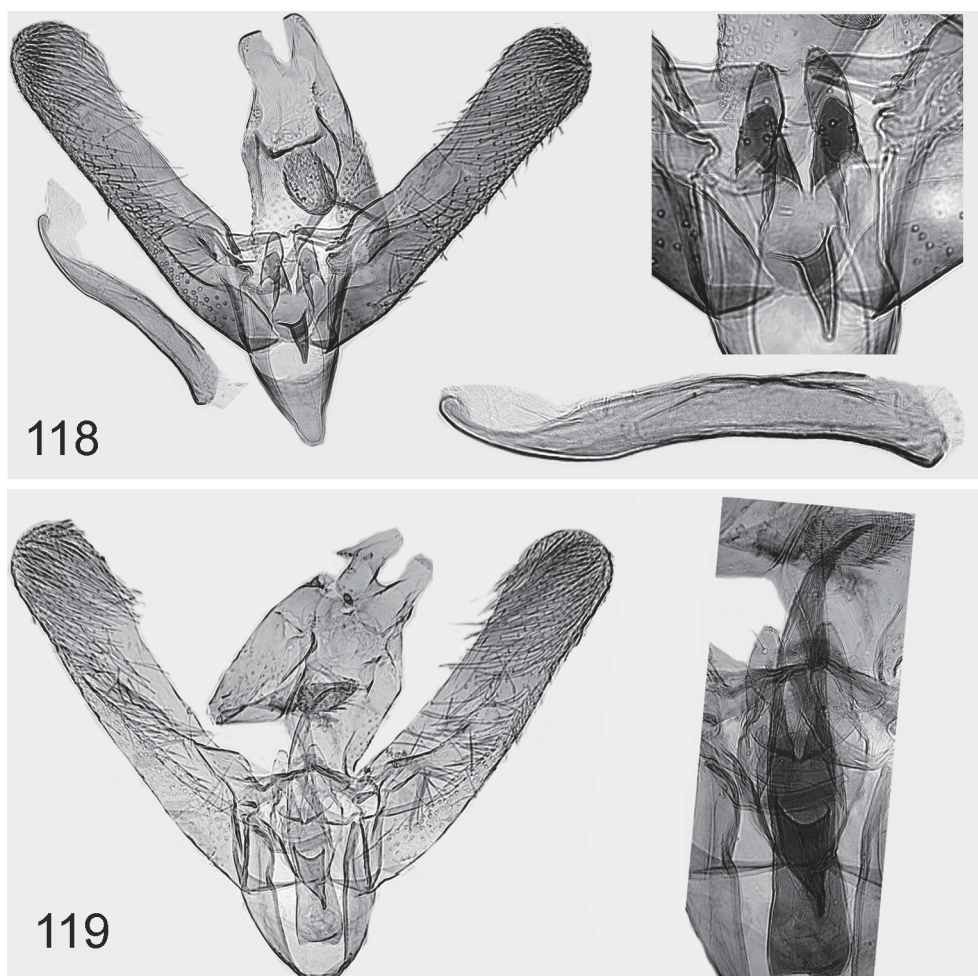


FIGURES 116–117. Male genitalia of *Elachista* spp. 116. *E. triseriatella* Stainton, holotype of *E. gregori* Traugott-Olsen. 117. *E. elsaeella* Traugott-Olsen, Sweden (L. Kaila prep. 3463).

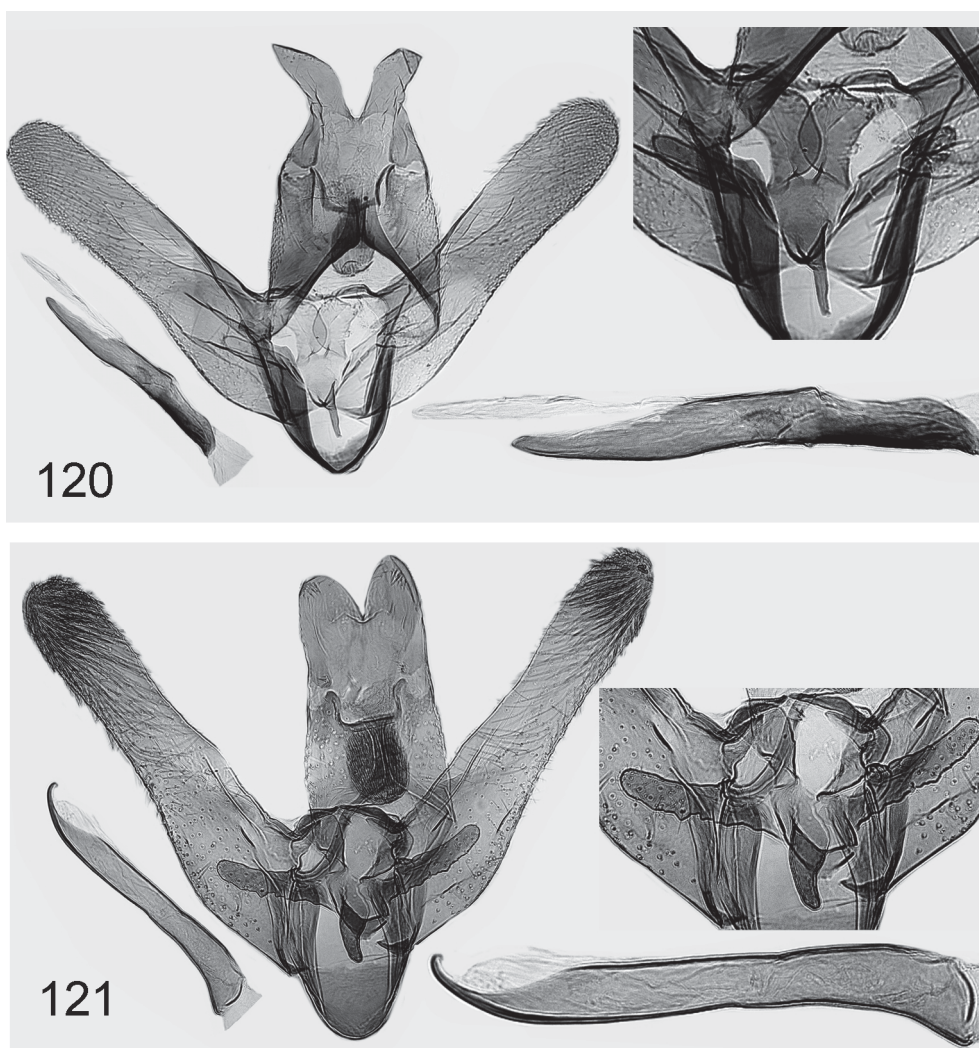
Material studied. Type material. Holotype ♂ of *E. svenssoni* labelled: Austr[ia] Mn [Mann]; Holotype [rounded with red margin]; *Elachista svenssoni* n. sp. det. E. Traugott-Olsen; Akvarel 28.11.86 E. Traugott-Olsen; Genital praeparat nr. K. 9.9.86 sex: ♂ E. Traugott-Olsen; DNA sample 16864 Lepid. Phyl. Coll. (NHMW).

Paratype ♂ of *E. svenssoni*: Austria superior, Klaus, 6.V.1956 J. Klimesch leg. Paratype [rounded with red margin]; Genital praeparat nr. H.4.8.86 sex: ♂ E. Traugott-Olsen *Elachista svenssoni* n. sp. det. E. Traugott-Olsen; DNA sample 16864 Lepid. Phyl. (NHMW). **Other material. Austria:** Austria superior, Hinterstoder, 12.VI.1938, 1 ♂, J. Klimesch leg., L. Kaila prep. 5838 (ZSM); Austria superior, Schön b. Klaus, 7.V.1950, 1 ♂, J. Klimesch leg., W. Hackman prep. 597 (MZH); Klaus, 12.VI.1932, 1 ♂, L. Kaila prep. 3939 (MZH); A/N Eichkogel S. Mödling, 48°03'N, 16°17'E, Tag, pannonische Halbtrockenrasen, Hecken, 320 m, 3.VII.2006, 1 ♂, P. Buchner leg., DNA sample 16993 Lepid. Phyl., 14.VII.2006, 2 ♂, P. Buchner leg., 2823 Pitten 386, L. Kaila prep. 5454, DNA sample 16096, 16998 Lepid. Phyl., 15.IX.2006, 1 ♂, P. Buchner leg., DNA sample 16994 Lepid. Phyl. (Coll. Buchner); A/N, 48°19'N, 16°643'E, Bisamberg, Licht, verbuschende Halbtrockenrasen, miscwald, 320 m, 24.VIII.2007, 1 ♂, P. Buchner leg., DNA sample 16997 Lepid. Phyl. (Coll. Buchner); A/N, 47°45'N, 16°15'E, 3 km SSW Katzelsdorf/L Auwald Halbtrockenrasen, Wiesenbrache, 290 m, 17.IV.2004, 2 ♂, P. Buchner leg., L. Kaila prep. 5453, DNA sample 16991, 16992 Lepid. Phyl. (Coll. Buchner). **Greece:** Florina Vatochorion, 17.V.1985, 2 ♂, P. Grotenfelt leg., L. Kaila prep. 4272, 5031 (MZH); Peloponnesos, Arkadia Vitina, 24.VI.1981, 1 ♂, P. Grotenfelt leg., L. Kaila prep. 4719 (MZH). **Hungary:** 47°80.534'N, 19°98.786'E, Gyöngyös, Sár-hegy, 350 m, 30.VIII.2011, 1 ♂, Z. Tokár leg., DNA sample 2140 Lepid. Phyl. (Coll. Tokár); 47°10'22"N, 17°58'04"E, Veszprem County, 10 km N Veszprem, 300 m, 29.VI.2002, 1 ♂, B. Skule & H. Hviid leg., L. Kaila prep. 4303 (ZMUC). **Italy:** 44°17'N, 7°23'E, Prov. Cuneo, Valdieri N., RN Junip. phoe., 900–1000 m, 1.VIII.2010, 1 ♂, P. Huemer leg., DNA sample 20828 (TLMF). **Romania:** 46°22'58"N, 23°34'44"E, Rimetea reg., 29–31.V.2009, 1

♂, O. Karsholt leg., L. Kaila prep. 5931 (Coll. ZMUC); **Slovakia:** Bojnice, 14.V.1996, 1 ♂, I. Richter leg., L. Kaila prep. 5476, DNA sample 21403 Lepid. Phyl. (Coll. Tokár); Černochovej, 2.V.2003, 1 ♂, I. Richter leg., I. Richter prep. 7353 (Coll. Tokár); Dlh Ves, 28.IV.2000, 1 ♀, I. Richter leg., L. Kaila prep. 5748 (Coll. Tokár); Dol. Vestenic, Šiare, 24.VIII.2007, 1 ♂, I. Richter leg., I. Richter prep. 12110 (Coll. Tokár); Kašvár, 24.VIII.2002, 1 ♂, Z. Tokár leg., L. Kaila prep. 5478, DNA sample 21405 (Coll. Tokár); Kozarovce, 29.VIII.2011, 1 ♂, F. Kosorin leg. (Coll. Tokár); Plešivec, 25.VII.2000, 1 ♂, I. Richter leg., L. Kaila prep. 5841 (Coll. Tokár); Plešivecka plan., 7.VIII.2001, 1 ♂, Z. Tokár leg., L. Kaila prep. 5484, DNA sample 21418 Lepid. Phyl. (Coll. Tokár); Rybník, 24.VIII.2007, 1 ♂, Kosorin leg., 11.V.2008, 1 ♂, L. Kaila prep. 5740, 18.VII.2008, 1 ♂, all F. Kosorin leg. (Coll. Tokár); Rybník-Cajkov, 24.IV.2010, 1 ♂, 18.VII.2010, 1 ♀, F. Kosorin leg., L. Kaila prep. 5749 (Coll. Tokár); Rybník v lese, 26.VI.2010, 1 ♂, F. Kosorin leg. (Coll. Tokár); Slov. kras-Hrhov, 4.V.2002, 1 ♂, Z. Tokár leg., L. Kaila prep. 5485, DNA sample 21419 (Coll. Tokár); Slov. kras-Turňa, 7.VII.2001, 2 ♂, Z. Tokár leg., L. Kaila prep. 5479, Tokár prep. 8038, DNA sample 21406 Lepid. Phyl. (Coll. Tokár); NP. Slovenský kras, Hrdná stráň, 13.VII.2002, 1 ♂, 6.VIII.2011, 1 ♂, Z. Tokár leg. (Coll. Tokár); NP. Slovenský kras, Krkavčie skaly, 18.V.2002, 1 ♂, Z. Tokár leg., L. Kaila prep. 4378 (Coll. Tokár); Slovensk kras Plešivec, 12.V.2006, 1 ♀, Z. Tokár leg. (Coll. Tokár); Slov. kras-Vidov, 27.VI.2001, 1 ♂, Z. Tokár leg., L. Kaila prep. 5477, DNA sample 21401 Lepid. Phyl. (Coll. Tokár), 6.VIII.2001, 1 ♂, Z. Tokár leg., L. Kaila prep. 5483, DNA sample 21417 Lepid. Phyl. (MZH); Vel'k vrch, 25.IV.1997, 1 ♂, I. Richter leg., L. Kaila prep. 5844 (Coll. Tokár); Vidov, 1.VIII.1999, 1 ♂ I. Richter leg., L. Kaila prep. 5745, 27.IV.2000, 1 ♀, I. Richter leg., L. Kaila prep. 5746 (Coll. Tokár); Vtáčnik Žarnov, 22.VII.2006, 1 ♂, I. Richter leg., L. Kaila prep. 5840 (Coll. Tokár). **Sweden:** Sm. Högsby, 21.VI.1975, 1 ♂, R. Johansson leg., L. Kaila prep. 3464 (MZH); Ög: Tidersrum, Bön, 4.VI.1996, 1 ♂, I. Svensson leg., L. Kaila prep. 3463 (MZH); Ög: Kolmården, UTM 33V WF8203, 29.VIII.1993, 1 ♂, I. Svensson leg. (Coll. Kaitila).



FIGURES 118–119. Male genitalia of *Elachista elsaella* Traugott-Olsen.. 118. Austria (L. Kaila prep. 5453). 119. *E. svenssoni* Traugott-Olsen, holotype.



FIGURES 120–121. Male genitalia of *Elachista* spp. 120. *E. arenbergeri* Traugott-Olsen (Tunisia, L. Kaila prep. 5265). 121. *E. deresyensis* (Turkey, L. Kaila prep. 3568).

Diagnosis. *Elachista elsabella* is a variable species, both regarding its size, the width of the valva and the length of the digitate process. The extent of variation of these male genitalia characters is shown in Figs. 117–119. The variation is continuous and appears to be similar throughout the distribution range, thus not diagnostic between *E. elsabella* and *E. svenssoni*. The male genitalia are characterized by the broad and bent phallus that has a hook-shaped apex. The phallus is similar also in *E. galactitella*, *E. deresyensis* and *E. oukaïmedenensis*. The males of these species can be identified from each other as follows; *E. galactitella* has unicolorous forewings, whereas the forewings are speckled in *E. deresyensis* and *E. oukaïmedenensis*. The juxta lobes are reduced in *E. oukaïmedenensis*, whereas they are developed in *E. galactitella* and *E. deresyensis*. The uncus lobes are twice as long as broad in *E. galactitella*, whereas they are as long as broad in *E. deresyensis*. In the females of *E. oukaïmedenensis* and *E. triseriatella* the areas laterad of the ostium bursae are sclerotized; the signum of *E. triseriatella* consists of two longitudinal, dentate rows, that of other species is a single dentate plate. Within the *E. dispunctella* complex, the female genitalia of *E. elsabella* most closely resemble those of *E. deresyensis*, both having the colliculum shaped as a short, sclerotized band. The ductus bursae of *E. elsabella* is membranous, that of *E. deresyensis* is anteriorly granulate with longitudinal ribs.

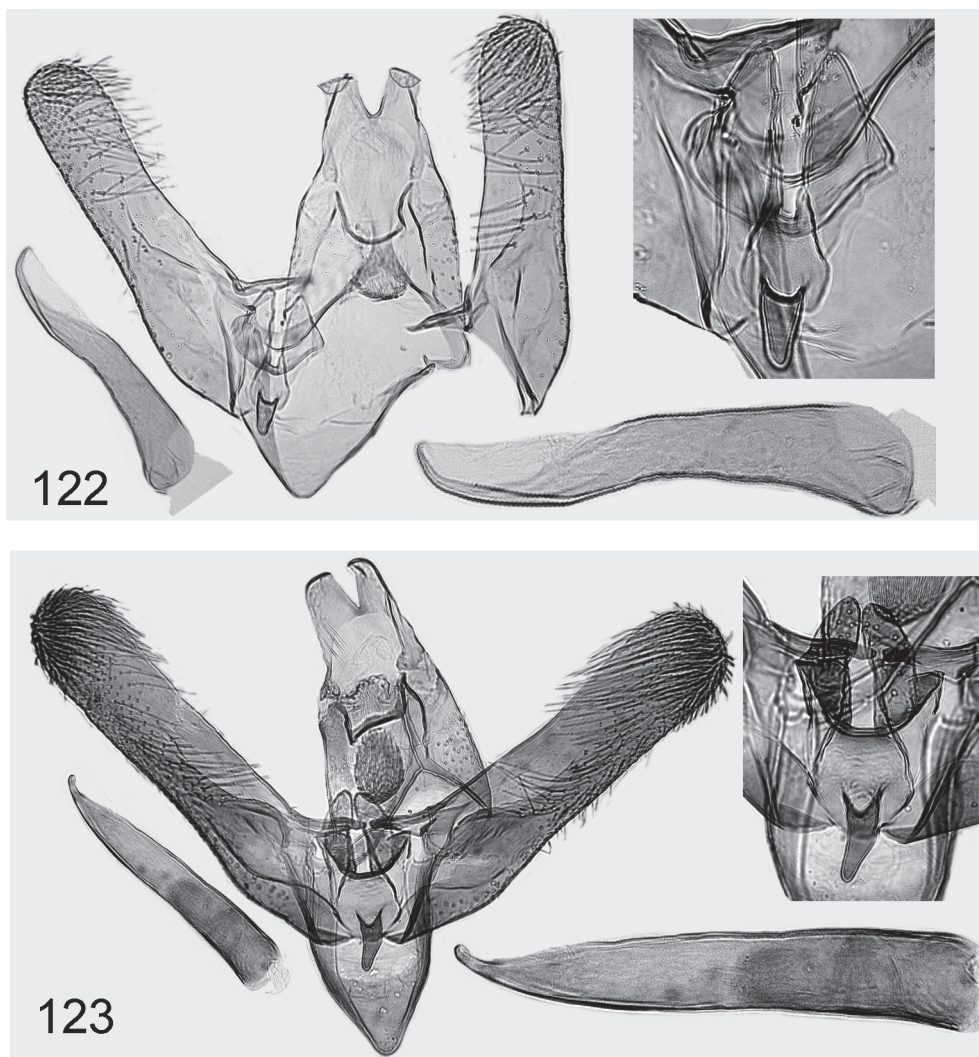
Biology. *E. elsabella* has a long flight period in Central Europe, probably partly depending on the exposition and elevation of collecting site. In Slovakia it is at least bivoltine, as specimens from the same localities have been captured in May and in August. Adults are active during the daytime and at dusk, and attracted to light at night.

Distribution. Austria, Greece, Hungary, Italy, Romania, Slovakia, Sweden.

Remarks. *E. elsabella* is referred to as OTU 2 in Mutanen *et al.* (2015). The barcodes of Swedish ('typical'

elsaella) and Central European specimens ('*svenssoni*') are clustered together with the distance between these of only 0.6–0.7%. In the absence of any evidence to the contrary, these populations are considered conspecific, and *E. svenssoni* a synonym of *E. elsaella*.

In the data of Mutanen *et al.* (2015) there is a taxon (i.e., OTU 3) whose barcode differs distinctly (3.7%) from *E. elsaella*. It is known from Croatia (Tribunj, 27.VI.2003, 1 ♂, Z. Tokár leg. & Coll., L. Kaila prep. 5475, DNA sample 21402 Lepid. Phyl.) and northern Italy. It seems to differ also by morphology from *E. elsaella*, but the limits of variation as compared to other close species is not known. The material available does not allow drawing conclusions on its taxonomic status.



FIGURES 122–123. Male genitalia of *Elachista oukaïmedenensis* Traugott-Olsen. 122. holotype. 123. Spain (L. Kaila prep. 5496).

***Elachista arenbergeri* Traugott-Olsen, 1988**

Figs. 53, 120, 145

Elachista arenbergeri Traugott-Olsen, 1988: 307.

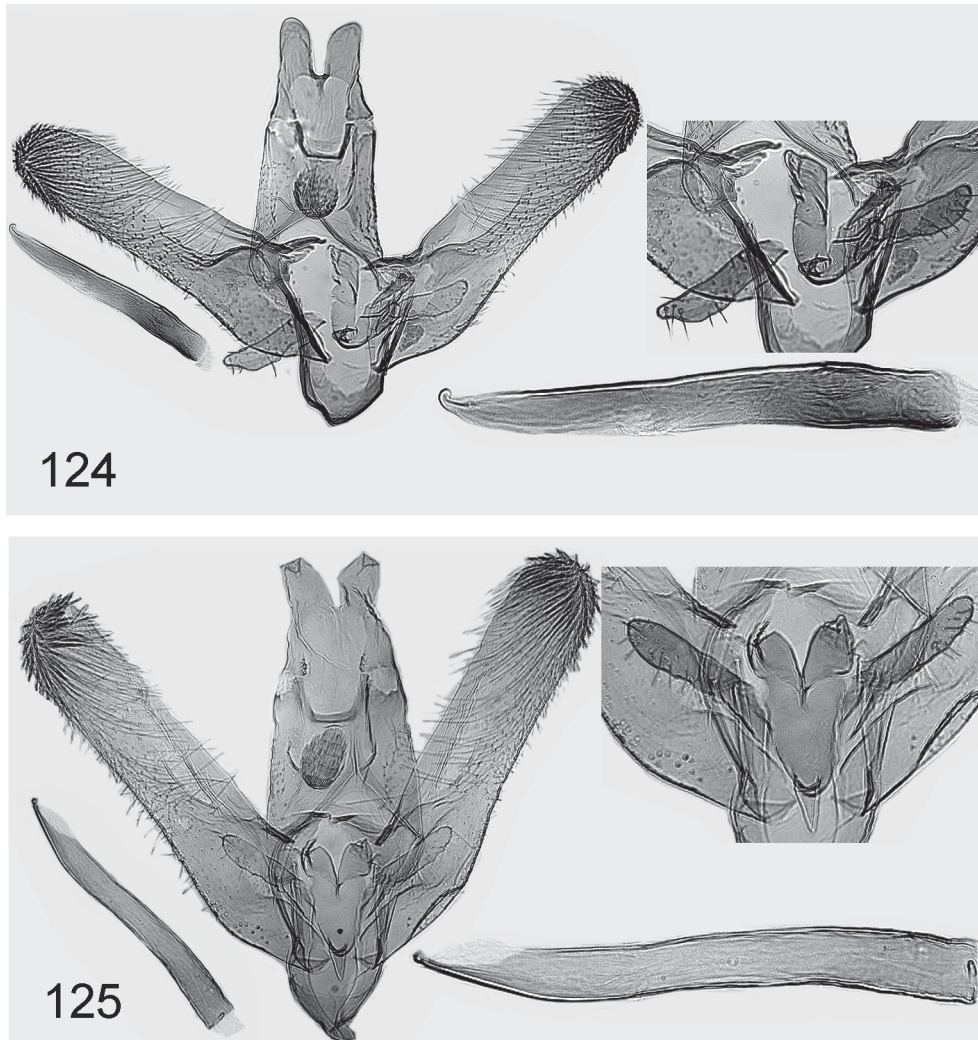
Material studied. Type material. Paratype ♂: Tunisia, 20 km W El Kef 18.–19.VII.1979 1 ♂ M. & E. Arenberger leg. (ZMUC). **Tunisia:** 10 km NW Kasserine, Djebel Chambi N., 18.XI.2009, 4 ♂, T. Nupponen leg., L. Kaila prep. 5306–7, DNA samples 15321–4 (Coll. Nupponen, 1 ♂ in MZH). ‘Mauretania’, Tunisia, Sud, Oase Metouia (Gabes), 28.IX–10.X.1980, 10 ♂, M. u. W. Glaser leg, L. Kaila prep. 5574, 5575, 5583, 5585 (SMNK); Sud, Oase Tozeur, 28.IV–11.V.1981, 1 ♂, 1 ♀, M. u. W. Glaser leg., L. Kaila prep. 5582, 5584 (SMNK).

Diagnosis. *E. arenbergeri* is a large species, white or pale yellow, often with ochreous dusting forming irregular, longitudinal stripes. The male genitalia are characteristic, with large, distolaterally pointed uncus lobes, as in species of the *E. dispilella* complex (cf. Traugott-Olsen 1990, Kaila *et al.* 2015). Unlike them, it has no cornuti. In addition, the corpus bursae contains no signum, and the ductus bursae is gradually widened anteriorly.

Biology. Unknown.

Distribution. Tunisia, Morocco.

Remarks. *E. arenbergeri* is referred to as OTU 6 in Mutanen *et al.* (2015).



FIGURES 124–125. Male genitalia of *Elachista galactitella* Eversmann. 124. Ural (L. Kaila prep. 3347). 125. Italy (L. Kaila prep. 4752).

***Elachista deresyensis* Traugott-Olsen, 1988 stat. rev.**

Figs. 54–55, 121, 146

Elachista deresyensis Traugott-Olsen, 1988: 308.

Material studied. **Turkey:** Ürgüp, 19–21.VII.1998, 7 ♂, 1 ♀, 5 km NW Ürgüp, 17.VI.1999, 1 ♂ J. Junnilainen leg. (Coll. J. Junnilainen and MZH).

Diagnosis. *E. deresyensis* is a medium-sized species of the *E. dispunctella* complex, with white forewing, scattered with brown tips of scales. The male genitalia are similar to those of *E. galactitella*, but the uncus lobes of *E. deresyensis* are broader than in *E. galactitella*, as long as wide; those of *E. galactitella* are twice as long as wide. The female genitalia are similar to those of *E. elsabella*, both having a small colliculum with distinct sclerotized

band. The anterior part of the ductus bursae is granulose with longitudinal ribs in *E. deresyensis*, smooth in *E. elsaella*.

Biology. Unknown.

Distribution. Turkey.

Remarks. Kaila (1999a) synonymized *E. deresyensis* with *E. galactitella* (Eversmann). Examination of new material suggests that the above synonymy is unjustified, and *E. deresyensis* is here re-instated as a valid species.

There is a sample of 29 males collected from Turkmenistan: Central part of the Kopetdagh Mts., 15 km W from Firyuza (now Poevryuze), Mt. Dushak, [2100 m a.s.l., mountain xerophytous belt, *Juniperus* tree savana-like forest], by light trap, VII 1990 V.V. Dubatolov leg. (SZMN, MZH); this taxon closely resembles *E. deresyensis*; externally its forewing maculation is black rather than brown, and in the male genitalia the valva is broader and the incision between uncus lobes deeper. Even though the external appearance seems to differ consistently from *E. deresyensis*, there is some variation in the width of the valva, similar to *E. elsaella*. Due to the limited material and unknown female for the Turkmenian taxon, it is not formally named here.



FIGURES 126–127. Female genitalia of *Elachista* spp. 126. *E. dispunctella* (Austria. L. Kaila prep. 5724). 127. *E. parvula* (Greece, L. Kaila prep. 5804).

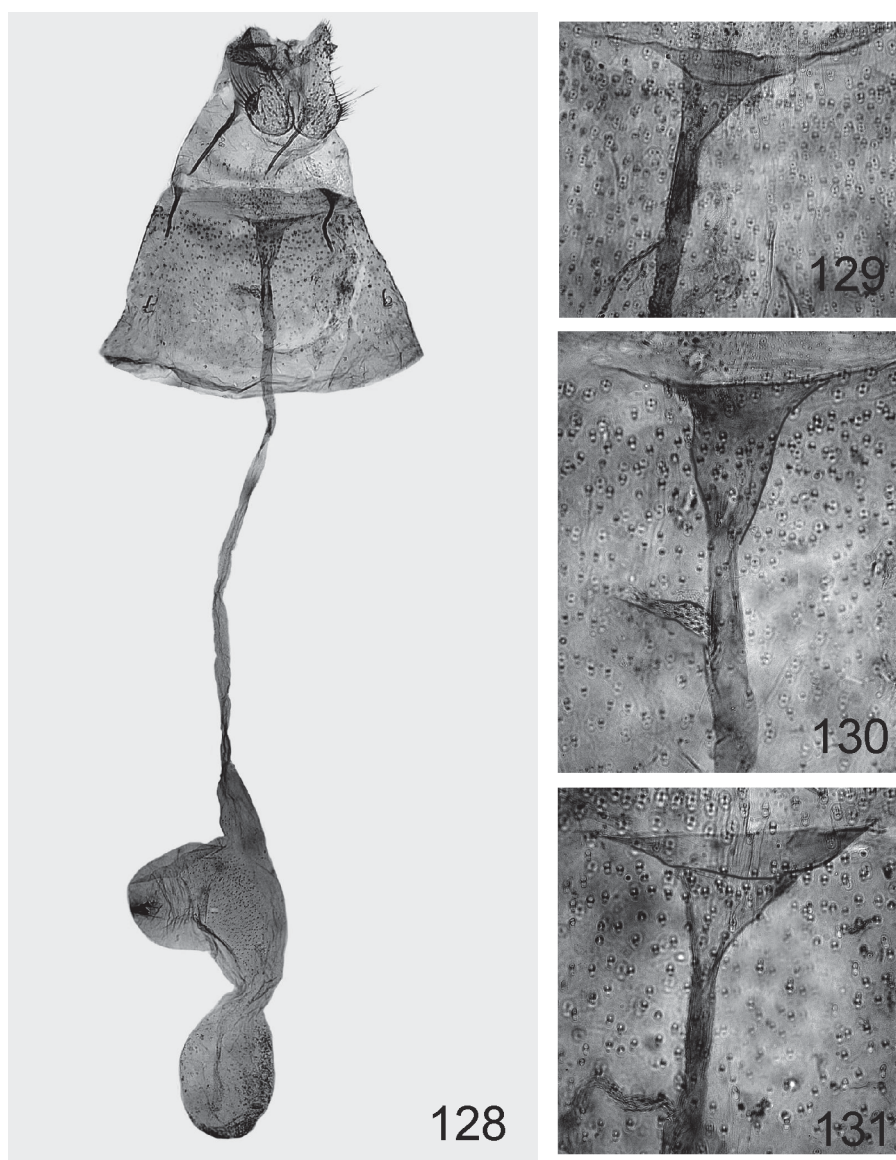
***Elachista oukaïmedenensis* Traugott-Olsen, 1988**

Figs. 56, 122–123, 147

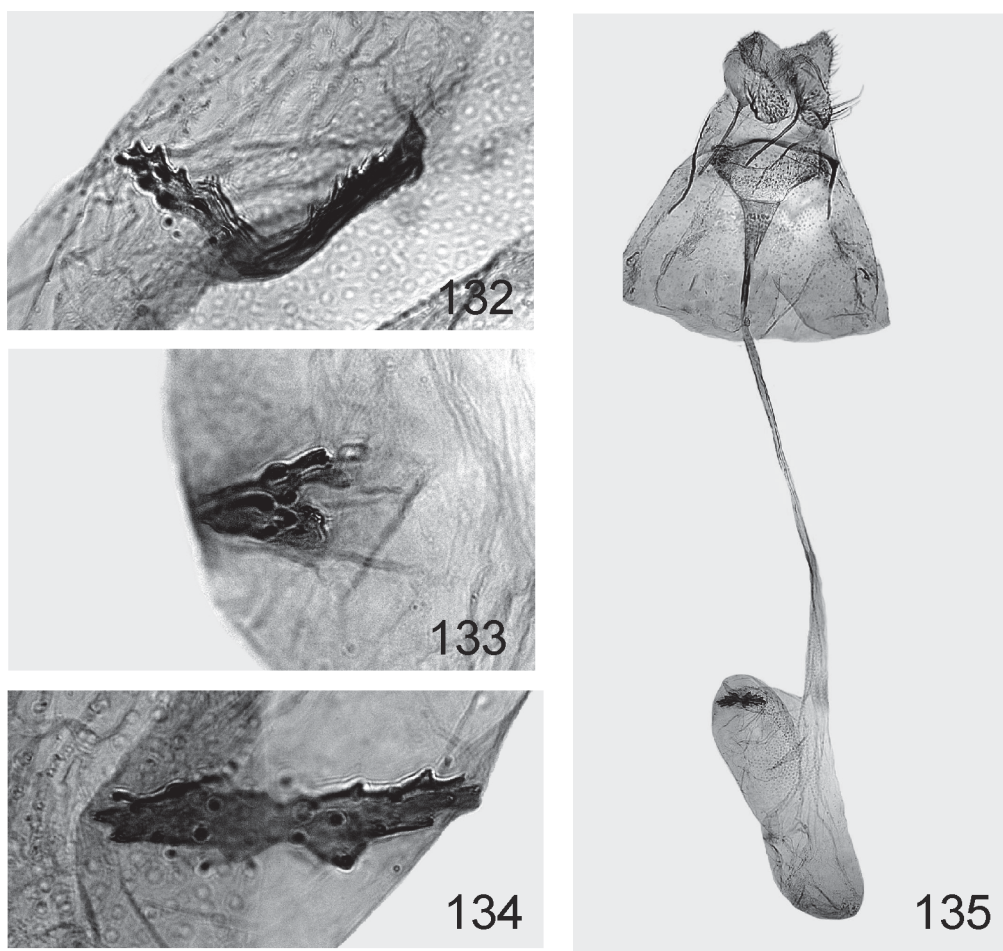
Elachista oukaïmedenensis Traugott-Olsen, 1988: 309.

Material studied. Type material. Holotype ♂ labelled: 10.7.1975, Marokko. Hoher Atlas, 4 km östl. Oukaim'den,

2200 m. F. Kasy leg.; Holotype [rounded with red margin]; *Elachista triseriatella* Stt. det. U. Parenti; prep. gen. n. 2723 U. Parenti ♂; *Elachista oukaimdensis* [sic] det. E. Traugott-Olsen; DNA sample 16866 Lepid. Phyl. (NHMW). **Other material. Spain:** 10 km NNW Albatera, 450 m, 15.V.2009, 1 ♂, J. Tabell leg., L. Kaila prep. 5496, DNA sample 21432 (MZH); Alicante, route 8 km N of Albatera env., 300 m, 27.IV.2009, 1 ♂, Z. Tokár leg., DNA sample 19992 Lepid. Phyl. (Coll. Tokár); 3 km SW Miguel de Salinas, 23.IV.2009, 3 ♂, J. Tabell leg., L. Kaila prep. 5497, DNA sample 21433 Lepid. Phyl. (MZH, Coll. Tabell), 16.IV.2009, 5 ♂, J. Tabell prep. 4443 (Coll. Tabell); 23.IV.2009, 10 ♂, Tabell prep. 4321, 4405, 4413, 4444 (Coll. Tabell); 8.V.2009, 1 ♀, Tabell prep. 4435 (Coll. Tabell); San Miguel de Salinas 3 km E, 18.IV.2009, 11 ♂, 1 ♀, J. Tabell leg. & Coll., Tabell prep. 4436, 4442, 4447, 4594, DNA sample 05587 Lepid. Phyl. (Coll. Tabell); 1.V.2009, 4 ♂, 1 ♀, J. Tabell prep. 4296, 4412, 4438, 4445, DNA samples 05568, 05585 Lepid. Phyl. (Coll. Tabell); 7.V.2009, 3 ♂, J. Tabell prep. 4313, 4427–8, DNA sample 05584 (Coll. Tabell); Alicante, 11 km NNW Albatera, 500 m, 12.V.2009, 1 ♂, J. Tabell leg. & Coll., J. Tabell prep. 4377, DNA sample 05569 Lepid. Phyl.; 10 km NNW Albatera, 450 m, 15.V.2009, 1 ♂, Tabell prep. 4318 (Coll. Tabell); 7 km NNW Albatera, 200 m, *Lygeum spartum*, 16.III.2010, em. 10.IV.2010, 1 ♂, Tabell prep. 4674 (Coll. Tabell); Murcia, Sierra Espuña, 1400 m, 3.IX.2000, 1 ♂, H. W. v.d. Wolf leg., L. Kaila prep. 3921 (MZH); Prov. Granada, Sierra Alfacar, 1300 m, 20.IX.1973, 2 ♂, M. u. W. Glaser leg., L. Kaila prep. 5818, 5820 (SMNK).



FIGURES 128–131. Female genitalia of *Elachista mabourella*, all from Spain. 128. L. Kaila prep. 5729. 129–131. Ostium bursae. 129. L. Kaila prep. 5728. 130. L. Kaila prep. 7529. 131. L. Kaila prep. 5730.



FIGURES 132–135. Female genitalia of *Elachista* spp. 132–134. Signum of *E. maboulella*, all from Spain. 132. L. Kaila prep. 5728. 133. L. Kaila prep. 7529. 134. L. Kaila prep. 5730. 135. *E. disemiella* (Spain, L. Kaila prep. 5720).

Diagnosis. *E. oukaïmedenensis* is externally similar to many other species of the *E. dispunctella* complex. The male genitalia are closest to those of *E. elsaella*, but the juxta lobes are well developed in *E. elsaella*, whereas they are almost entirely reduced in *E. oukaïmedenensis*. The female genitalia are characteristic, with broad sclerotizations laterad of ostium bursae. Only the female of *E. triseriatella* has such sclerotizations, but they are much narrower than in *E. oukaïmedenensis*.

Biology. Host plant of larva is *Lygeum spartum*.

Distribution. Spain, Morocco.

Remarks. *E. oukaïmedenensis* is referred to as OTU 1 in Mutanen *et al.* (2015).

***Elachista galactitella* (Eversmann, 1844)**

Figs. 57–58, 124–125, 148

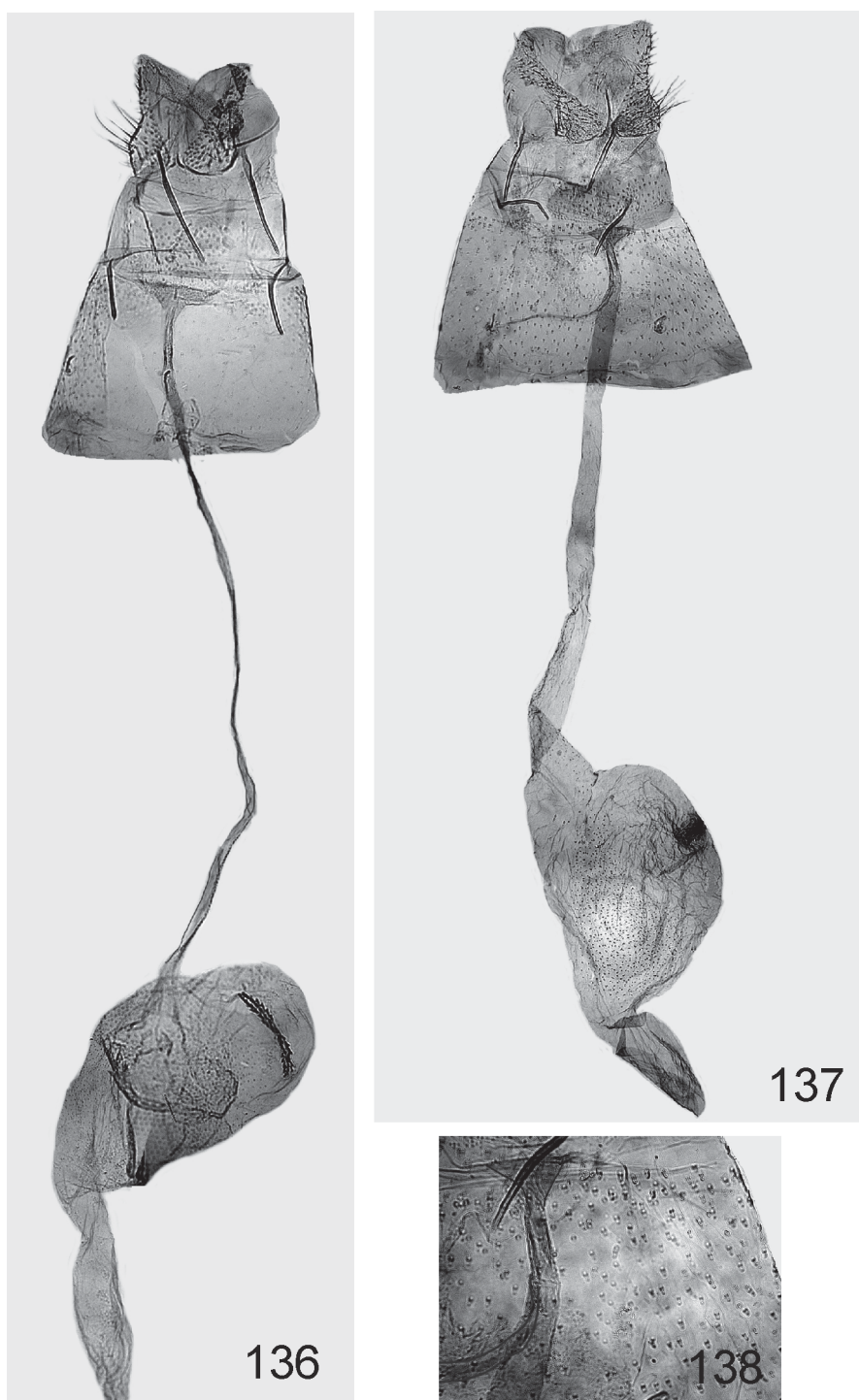
Oecophora galactitella Eversmann, 1844: 595.

Elachista galacticella, incorrect subsequent spelling.

Elachista bustilloi Traugott-Olsen, 1988: 306; Parenti (2001).

Elachista madridensis Traugott-Olsen, 1992: 202. **Syn. nov.**

Material studied. Type material. Holotype ♂ of *E. madridensis* labelled: Type [rounded with red margin]; Wing praeparat nr. a.4.11.89 sex: ♂ *E.* Traugott-Olsen; Campo Real, Madrid, 640 m, 2-7-1982 A. Vives leg. *Elachista madridensis* sp. n. det. E. Traugott-Olsen; Holotipo [red]; MNCN Cat. Tipos No 11371 [red]; MNCN Prep. Gen. No 60980 [the preparate contains a pair of wings, the specimen was originally without abdomen] MNCN_Ent No



FIGURES 136–138. Female genitalia of *Elachista* spp. 136. *E. tribertiella* (Spain, L. Kaila prep. 5576). 137–138. *E. glaseri*. 137. Spain, L. Kaila prep. 5727. 138. Ostium bursae (L. Kaila prep. 5727).

Cat. 42116 (MNCN, Madrid). **Other material. France:** Gallia mer. Provence, La Bessee, 1100 m, M. u. W. Glaser leg. [no date]; L. Kaila prep. 5809 (SMNK); Provence, 4 km N Eyguians, 12.VI.1989, 1 ♂, B. Å. Bengtsson leg., Bengtsson prep. 3370 (Coll. Bengtsson). **Italy:** Prov. Calabria, Monte Pollino, 3 km N of Civita, 800 m, 31.V–1.VI.2005, 5 ♂, 1 ♀, P. Skou leg. L. Kaila prep. 4752, 4753, 4754 (prep. 4752 in MZH, 4753, 4754 in ZMUC); Sesvenne valley, Laatsch, 4.VII.2004, 1 ♂, J. Junnilainen leg., L. Kaila prep. 5078 (MZH); 7.VII.2004, 3 ♂, J. Junnilainen leg. & Coll.; Bolzano, above Laatsch, steep open slope, 1180 m, 46°40'43"N, 10°31'38"E, uvl, 10.VII.2004, 5 ♂, B. Landry & P. Schmitz leg. (MHNG); Valle d'Aosta, Dint. Ozein, Aymavilles (Aosta), 1250 m, 5.VII.1989, 1 ♂, U. Parenti leg., J. Tabell prep. 4457 (Coll. Tabell); 14.VI.1990, 1 ♀, (Coll. Tabell); V. d'Aosta,

Ozein (Aymavilles, AO), 1250 m, *Stipa pennata*, A143, 13–22.VI.1994, 3 ♂, 1 ♀, P. G. Varalda leg. (Coll. Tabell); **Russia:** S. Ural, Verbljushka, 10.VI.1998, 1 ♂, T. & K. Nupponen leg. (L. Kaila prep. 3347, MZH), 14.VII.1998, 2 ♂, 15.VII.1998, 1 ♂, K. Nupponen leg., 19.VI.1999, 2 ♂, T. & K. Nupponen leg. (Coll. Nupponen), S. Ural, Orenburg district, Donskoje village 6 km S, mount Verbljushka, 27.VI.2003, 1 ♂, K. Nupponen leg. (MZH); 28.VI.2003, 2 ♂, K. Nupponen leg., J. Tabell prep. 4382, DNA samples 16258–9 Lepid. Phyl. (Coll. Tabell). **Switzerland:** Ws., 600 m, Leuk-Pfynwald, 6.VI.2001, 5 ♂, 9.VI.2001, 1 ♂, 25.VIII.2001, 1 ♂, Landry & Merz leg. (MHNG, MZH).



FIGURES 139–140. Female genitalia of *Elachista* spp. 139. *E. hispanica* (Spain, L. Kaila prep. 5733). 140. *E. triseriatella* (Denmark, L. Kaila prep. 5774).

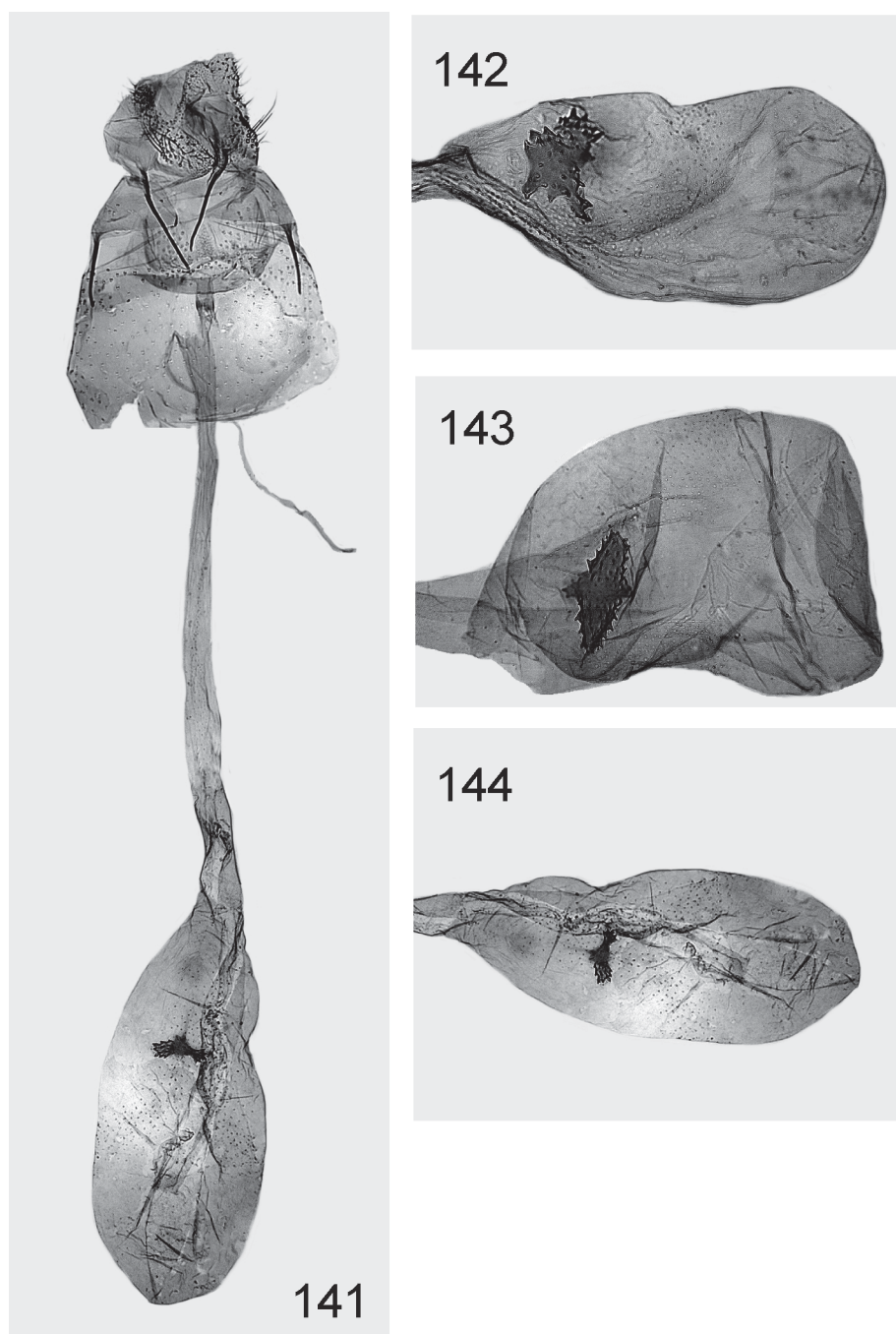
Diagnosis. Forewing of *E. galactitella* is shiny white. It most resembles *E. kalki* Parenti, which is more stout-bodied with broader wings. Their genitalia are entirely different (cf. Kaila 2005). The male genitalia are similar to those of *E. deresyensis*, but differ by the width of uncus lobes: they are twice as long as broad in *E. galactitella*, about as long as broad in *E. deresyensis*. The female genitalia most resemble those of *E. elsabella*. They differ by the size of antrum which is significantly larger in *E. galactitella*. It also lacks a sclerotized band typical of *E. elsabella*.

Biology. This species has been reared in an ex ovo experiment on *Stipa pennata* L. (Poaceae) in the laboratory (Parenti 2004).

Distribution. France, Italy, Spain, Russia and Switzerland. Parenti (2001) also mentions Turkey. This record is based on the erroneous synonymy of *E. deresyensis* and *E. galactitella* by Kaila (1999a).

Remarks. *E. galactitella* is referred to as OTU 4 in Mutanen *et al.* (2015). The synonymy of *E. bustilloi*

Traugott-Olsen and *E. galactitella* Eversmann was established by Parenti & Domínguez (1995) and again by Parenti (2004) with a somewhat more detailed account. The single known specimen of *E. madridensis* was collected together with the holotype of *E. bustilloi*. The *E. madridensis* specimen lacks an abdomen. Its external appearance is identical to that of *E. galactitella* (*E. bustilloi*, a synonym of it) with a shiny white forewing. *E. madridensis* is considered a synonym of *E. galactitella*.

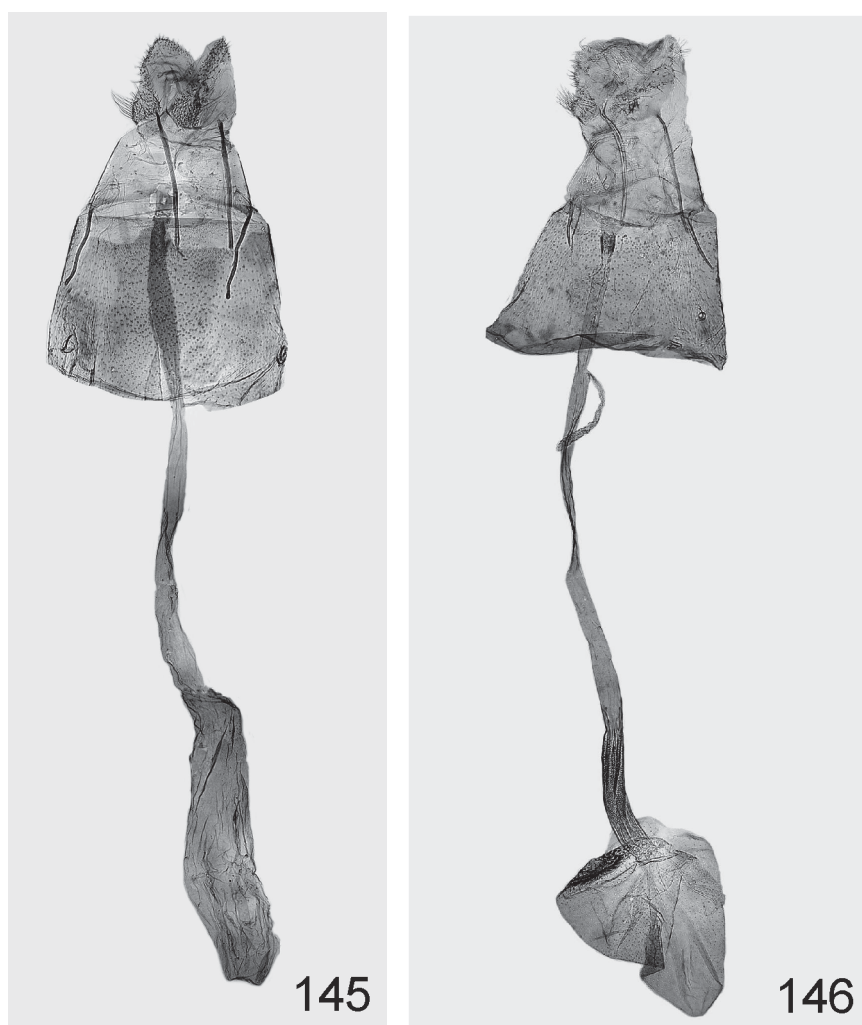


FIGURES 141–144. Female genitalia of *Elachista elsabella*, all from Slovakia. 141. L. Kaila prep. 5749. 142–144. Corpus bursae. 142. L. Kaila prep. 5746. 143. L. Kaila prep. 5748. 144. L. Kaila prep. 5749.

Discussion

The present study attempts to clarify a case where species delineation has relied upon characters not suitable for this purpose, resulting in spurious taxonomy with tens of taxa, that morphological and barcoding evidence suggests

to be synonyms. There are other cases like the present one where species have been grossly overplit because of the lack of larger series of specimens to measure intraspecific variation and access to barcoding methodology to test species concepts (e.g. Huemer & Karsholt 2010). The taxonomic problems with these groups, even if quite extreme, are a manifest of the difficulty of the species taxonomy in the Gelechioidea. Despite the cases of taxonomically oversplit groups, a more general pattern is the opposite, i.e. the existence of a vast number of undescribed species in this superfamily. The deficient literature on Gelechioidea, especially in the tropics, thus likely severely underestimates the number of species (e.g. Novotny *et al.* 2010; Kaila *et al.* 2011). In several families of this very species-rich superfamily species are difficult to identify due to their superficial similarity. Recent examples of groups with considerable increase in numbers of species that have been recognized due to thorough taxonomic scrutiny are Adamski (2005, 2013) for Glyphidocerinae and Blastobasidae, respectively; Kaila (2011a) for Australian Elachistinae; Hodges (1999) and Huemer & Karsholt (2010) for groups of Gelechiidae; and Landry (1991) and Bengtsson (2014) for Scythrididae. In general, the lack of externally obvious diagnostic features together with the necessity of time-costly dissection of the genitalia has caused the taxonomic work to lag far behind the collecting of samples.



FIGURES 145–146. Female genitalia of *Elachista* spp. 145. *E. arenbergeri* (Tunisia, L. Kaila prep. 5584). 146. *E. deresyensis* (Turkey, L. Kaila prep. 5805).

DNA barcoding, now routine, has proven to be quite effective in screening rough taxonomic pattern in large samples of organisms. The use of it has also been vital in the present study. The vast number of nominal taxa with subtle or no detected differences have made the identification of many specimens virtually impossible using genitalic characters together with the literature. Even though a reasonable species concept gradually took shape for a majority of the taxa by examination of large numbers of genital dissections, the support of, and congruence with,

the results of extensive DNA barcoding gave more strength to the conclusions, and considerably helped in resolving some taxonomic issues as well as associating males and females. Nevertheless, all issues could not be reliably studied in-depth in this study, either due to the paucity of material available or due to the lack of morphological differences between markedly differing haplotypes. Only with better samples and more information may their status be elucidated in the future.



FIGURES 147–148. Female genitalia of *Elachista* spp. 147. *E. oukaimedenensis* (Spain, J. Tabell prep. 4674). 148. *E. galactitella* (Italy, L. Kaila prep. 4754).

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